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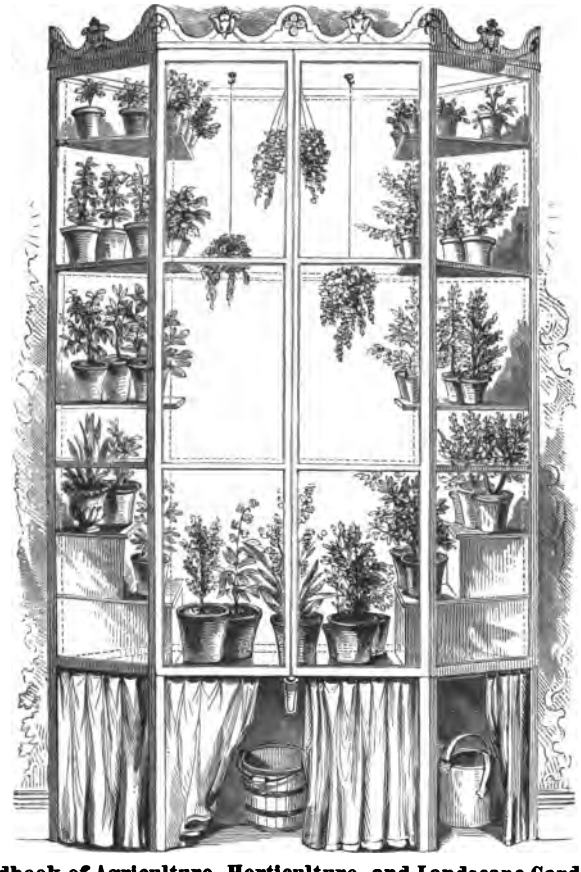
1974

Supplement to the Fifth Edition of

COUNTRY LIFE.

BY

ROBERT MORRIS COPELAND.



A Handbook of Agriculture, Horticulture, and Landscape Gardening.

BOSTON:
DINSMOOR & COMPANY.
1866.

COUNTRY LIFE:

A HANDBOOK OF

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BY ROBERT MORRIS COPELAND.

VIEW AT BEAVER BROOK FALLS, THE AUTHOR'S RESIDENCE.

FIFTH EDITION, REVISED.

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To

ALL LOVERS OF NATURE

AND TO ALL ENGAGED IN CULTIVATING AND ADORNING THE EARTH,

This Book is Dedicated,

WITH THE EARNEST HOPE THAT IT MAY ATTRACT TO THE PRACTICE OF
THE ARTS OF CULTURE SOME WHO WILL SEE THAT THE PURSUIT
IS FULL OF PLEASURE,
WITH NO MORE THAN A HEALTHY AMOUNT OF LABOR.

AND ALSO,
WITH THE HOPE THAT SOME WHO NOW EARN THEIR BREAD WITH
THE SWEAT OF THEIR BROW, AND LOOK UPON THEIR
CALLING AS A TREADMILL OF DRUDGERY
AND ENDURANCE,
MAY HERE LEARN THAT WITHIN THE ROUND OF THEIR DAILY DUTIES
THEY HAVE EVERY THING WHICH CAN EXPAND THE MIND
AND ENNOBLE THE SOUL.

PREFACE.

THE practice of the useful arts necessarily precedes their theory by a great interval, for it alone can furnish reliable material whence principles may be deduced, and rules determined; and there can never be a time when it shall cease to be the test to which all rules and theories must be subjected. This is pre-eminently true of agriculture, the oldest of the useful arts, through all its branches, and it is, therefore, in vain to look for a book on the culture of the earth which shall be altogether or mainly original; all such books, resting on the experience of the past, must, of necessity, refer to the past, must recapitulate its discoveries and practice, in greater or less degree. Unless they be monographs of peculiar speciality, they must partake somewhat of the nature of a compilation borrowing from many sources. I wish to acknowledge the ideas, the words, the illustrations which I have borrowed; and if I have failed to do this in any instance, the omission is not intentional. In some cases the views of others are so incorporated with and modified by my own, that it is out of the question to preserve the distinction between them.

Stevens (Book of the Farm), McIntosh (Book of the Garden), Loudon, Price, Liebig, Way, Gisbourne (Essays), Paul, Johnston, Boussingault, the journals of various English agricultural societies, are the European sources to which I am mainly indebted; whilst among American authorities I have principally

referred to Dana, Browne's Muck Book, Text Book of Agriculture, McMahon, Hovey, Shedd, The Working Farmer, Field's Pear Culture, with some newspaper items. Of course there are many things within this wide range of which I have had small personal experience; in such cases I have relied entirely on the best authorities, applying them as my general experience dictates.

In the body of the work I have met some of the popular arguments against the course of adopting largely the English improved culture, but not so fully as to preclude a few general remarks in this preface. Without doubt our common practice is just where English agriculture was forty years ago. The descriptions of English farming, tools, buildings, crops, roads, etc., given by Young and other writers of that time, might be quoted word for word to-day, as descriptive of the mass of New England farms. And if English farmers followed this kind of farming forty years ago with profit, and have since improved their practice so much as to double and treble their profits, with no other change in the circumstances than an increased outlay of capital and intelligence, it seems to me that it logically follows that we can do the same.

The frequent discussions about high farming seldom lead to definite and satisfactory conclusions, for want of a precise and accepted definition of the term. High farming in this book is the name of that culture which provides for the thorough reclamation, drainage, and manuring of the land under treatment; so thorough a manuring that a single application will ensure ample food to all the crops of the sagaciously planned rotation; which so arranges the rotation for each field that each crop comes at a time when the soil is in the best state to feed it, finds an excess of its favorite food, and yet leaves an excess of the food most appropriate for the next crop; which looks on

every weed as a thief, and on the labor expended in securing neatness, cleanliness, and order as certain to increase the final profit; and which leads, by intelligent steps, from improvement in the culture of earth to the yet more profitable and the far more noble culture of the man. These steps I have endeavored to point out in part. Sometimes I have invited the reader to trace them with me, hoping that he may find the result to which they lead eminently *practical.*

The calendar form, and the general divisions which recur in every month, have been adopted as facilitating reference.

The course announced in the opening pages, viz., to give but one method in cases where many are practised, and each has warm advocates, may expose me to the charge of ignorant conceit and dogmatism, but it has been deliberately chosen for the convenience and advantage of the general reader, who is not supposed to be an adept in any of the departments treated of. To him this book is offered as a manual for guidance; it would but confuse him if it presented many methods, and left him to choose between them. I have myself often suffered from the difficulty of ascertaining what was *the best* way of doing something I had in hand, when I had books enough which told in how many ways the thing was done, a matter to which one is perfectly indifferent when work presses upon him; and in my profession of Landscape Gardener, I have often remarked that much of the expense of obtaining answers to the innumerable questions put to me on all the subjects treated in these pages, might be saved to my employers by a simple printed statement of leading principles and rules. The adept likes to decide between different methods presented; the tyro is glad to learn what his teachers prefer.

I have tried to make all obscure operations and descriptions more clear by illustrations, where the eye often reads more at

a glance than in many pages of print, and I here acknowledge my obligations to Mr. A. C. Warren, of Boston, the artist who drew the illustrations which form so important a part of the book. Also, I would again mention my indebtedness to J. H Shedd, both for the quotations I have made, and for the system of drainage shown upon the plan with which our book opens, which was arranged by him.

To my friend Frederick Winsor, M. D., of Salem, I owe much gratitude for assistance, which none but an intimate friend could have given, in revising and correcting my hastily written manuscript. But for his aid the short time which my engagement with the publishers allowed for the preparation of the book would scarcely have admitted of critical revision.

Bulky as the book is, it does no more than open many approaches to an exhaustless subject, and I lay down my pen with a feeling of deep regret that I have done so little justice to what is so near my heart.

One word on a point to which many words are given in this volume; the *spirit* in which one should deal with his farm, his flowers, his grounds. Surely it should be that of reverential friendship, not of cold and superficial business relation. This complex, and beautiful mystery, which we call Nature, surely offers us something more than food and clothing; and, believing as I do, that man's "life is more than meat," I cannot speak of the life of that class who seem to live nearest Nature as nothing more than a struggle for that miserable pittance known as a "*living*."

With these explanations I leave my book to the reader, asking him only to bear in mind the words of a Boston orator, who said, "that a book should be judged not merely by its contents, but by the intention of the author."

PREFACE TO FIFTH EDITION.

In the preface to the first edition of "Country Life," I maintained, that, in agriculture, experience must govern theories, and that any treatise on the subject must owe much of its value to the degree in which its rules and principles are based upon the results of experience.

Whilst this is true, we must not allow ourselves to become the slaves of experience, which, it may be said, is the constant tendency of farming life. To this day, many men sneer at book-farming as theoretical and unreliable, and resist, as an encroachment on their rights, those theories of cultivation which seem to disagree with the wisdom of the ancients.

Nothing would have broken down this feeling and resistance but necessity. When men have a certain result to obtain, and to obtain it must use the labor of men and animals, and supply tools and machines, they are compelled, if the labor is scanty, to try to devise, either methods for getting the result without the labor, or to perform the labor in some different way. If a man's tools and machinery are worse and less profitable than his neighbor's, the fact that the result in dollars and cents is against him will incline him to copy his neighbor.

The long war we have passed through has absorbed so much of the available labor of the country, and at the same

time increased the value of the products of agricultural labor, that farmers have been compelled to invent either new machines or new crops, and methods of culture.

As a consequence, we have made vast improvements in agricultural machinery, particularly in harvesting tools. The mowers and reapers of 1866 are so much better than they were in 1859, that the work of haying and harvesting is reduced from severe to easy work, and a man and boy will now do the work on a farm which formerly required half a dozen men.

In Horticulture, new plants and fruits are introduced every year: some, upon trial, are proved to be of little value, and soon disappear, whilst a few become permanent friends and comforts to man. In the cultivation of grapes, there has been a great advance; and not only do we now have very greatly improved varieties, but a thousand cultivate grapes to-day in place of a hundred six years ago. With these new varieties and the widely spreading cultivation, new diseases have come, and some men have suffered so severely, that they have lost heart, and are inclined to abandon the vine; but, fortunately, man is a persevering animal, particularly when eating and drinking are the stimulants to his efforts, and we may rest assured that the grape or grapes will yet be found which will overcome all obstacles, and be equally good for the table and the vineyard. In the Supplement, the subject is extensively treated, and the reader will find there not only the best varieties for different parts of the country, but also the opinions of eminent cultivators as to the causes and cures of the most annoying diseases to which grapes are liable.

In the Flower-garden, I have introduced many new plants, as well as new lists of old friends, and have urged strongly the claims of some which I had hitherto neglected.

In the Agricultural division, I have brought together a large number of facts about Merino sheep, and have endeavored to urge farmers generally to do more to derive, by the aid of sheep, the full value from their farms. When we comprehend the real benefits which sheep confer on their owners, it is difficult to understand why so few persons, comparatively, have flocks. The Merino sheep is a proof of what may be done in New England to raise the value of agriculture and stock-raising.

I have presented in the Ornamental department, somewhat at length, the horticultural capabilities of cities. I do not seek to persuade the reader that the citizen can have the beauty, the wealth, or comfort of the country; but there is undoubtedly a great deal of space wasted in cities, which might be turned to good use, and give both amusement and real enjoyment to those who have only a brick house for a garden.

Doubtless the careful reader of "Country Life" has found methods of doing work with which he could not agree, or which seemed to him to be better done in some different manner. To all such let me say, that I never professed to give all the ways of conducting the operations incident to a life in the country,—only one way, which I was well assured would give a good result; and if, by disagreeing with me, I have stirred the active minds of men to investigate the subject, and produce newer and better methods than my own, I have certainly conferred a favor on them and all mankind, and may well feel satisfied with the labor and time I have expended.

Hoping that the Supplement to this edition may bring the book up to the present time, I leave it once more to make its way through the world, trusting that whoever reads it will find more to approve than condemn.

SUPPLEMENT.

CHAPTER I.

THE GREENHOUSE AND CONSERVATORY.

SINCE "Country Life" was first published, very many new green and hothouses have been constructed, and we ought to expect a corresponding improvement in heating, ventilating, and the use of materials; and, although great improvements have been made over the common practice of former times, a careful examination of the plans and theories herein presented will show that "Country Life" is still in advance of the times. We gladly welcome every new house, whether erected for purely commercial purposes or for private gratification; for, besides the pleasure their fruit and flowers give their owners, they exert a liberalizing and humanizing influence on every one who comes into contact with them. The most earnest lover of nature and flowers, who will readily walk miles in the fields and forests for the pleasure of association with nature, or to procure some favorite flower, who knows the delight with which one finds a rich bed of Epigæa in blossom, a bank of Violets, a tuft of Pogonia, a hedge of wild Roses, or the fringed Gentian, feels a still keener pleasure when he enters in winter a planthouse full of blossoms.

We seem then to especially realize the value and beauty of flowers; and but few persons are so stolid or careless as not to wish, when they visit a greenhouse, that they too might have plants in blossom during the winter. The contrast between the cold silence of nature out-of-doors, and the rich glow and fra-

grance within, compels us to recognize the real beauty and significance of the flowers, which we are too apt to neglect in the profusion of summer.

Keeping pace with the increasing number of planthouses, many families of plants have been greatly increased, and have sprung from the minority to the majority in point of numbers. This change is most conspicuous in the plants with variegated leaves, which have become sufficiently numerous to demand special accommodation; these plants have an advantage over others in the contrasts of color in their foliage, which make them interesting when not in blossom; some indeed are more valuable for their leaves than their flowers. The following list of the most desirable variegated plants, for a private collection, was made for me by Jonathan French, Esq., of Roxbury, Mass., who has been a very successful cultivator of these plants: —

BEGONIA, — rex, reichenhernia, grandis, argentea, Queen Victoria, Madame Roy, Madame Crouse, velvetiana, Madame R. L. Stewart, verschaffeltii.

CALADIUM, — argyrites, bellemeyii, barraquinii, chantinii, bicolor picturata, Newmanii, pictum, pœcile, hastatum, Wightii, bicolor.

FERNS, — plais, argyræa, tricolor, cretica alba lineata.

CROTON, — picta, variegata, noblesse.

MARANTA, — zebrina, regalis, alba lineata, fasciata, eximea.

ANŒCTOCHILUS, — argenteus, Eldorado.

POTHOS, — argyræa

ANANASSA, — sativa variegata.

PANDANUS, — javanicus argenteus.

DIFFENBACHIA, — seguina picta.

ASPIDISTRA, — lucida variegata.

APHELANDRAÆ, — leopoldii

DRACŒNA, — terminalis, picta.

HOYA, — variegata.

ERANTHEMUM leuconervum.

BILLBERGIA, — zebrina, gesnera splendidissima.

DIOSCOREA, — discolor, zebrina.

AGAVE AMERICANA variegata.

LEDUM, — carneum, variegatum.

HYDRANGEA, — variegata.

CHAPTER II.

FLOWER-GARDEN.

THE flower-garden has been sensibly affected by the increased interest in horticulture: the number of genera of flowers has not been increased, but the number of species has expanded immensely.

Whole exhibitions of our horticultural societies have been given to special plants, such as the Gladiolus, the Cape Bulb, the Japan Lilies, Verbenas, or Petunias, which a few years ago were content to occupy a very small space. For many years it was supposed that new varieties of plants could be produced only by a kind of legerdemain; for instance, Tulips, we were told, would change their color if we drew different colored silken or worsted threads through the bulb, that the color of thread might pass into the circulation and change the petal; there were also minute directions for special composts and watering solutions, which, applied around the growing plants, would change color and form.

None but special gardeners cared to try to bring new varieties for seed; Tulips and Gladiolus bore seed, but it was supposed they could not be expected to blossom from the seed under five or seven years. All this has changed, and we have every year increasing numbers of seedlings, some better, others not so good as their parents; the seedlings, generally, seem less reliable and permanent than the old varieties, and many of them are never heard of after a year or two.

Tulips can be produced from seed in three years, instead of seven, as formerly believed.

Gladiolus seeds, planted the year they ripen in peaty soil, and carried through the winter in a greenhouse or pit, will blossom in two, or, at most, three years; and, starting from the pretty but not especially interesting G. Byzantinus, the beautiful but weakly

G. Cardinalis, the G. Psittacinus, the brilliant G. Gandavensis, several hundred new and magnificent varieties of Gladiolus have been produced, which are so varied in color and form that one might well be excused if he devoted himself to their culture to the exclusion of all other flowers; grown singly, tied up to stakes, nursed in beds, retarded to give a succession of bloom, there is really no bulbous plant which repays so bountifully the care expended upon it.

The Gladiolus requires no special culture. A rich, light, well-drained garden soil will produce splendid flowers; its worst enemy is the mealy bug; if any bulbs are found to be troubled with them, burn the bulbs at once.

The bulbs should be taken up as soon as the leaves turn yellow, be dried rapidly, and kept in a cool place until spring; never plant it in wet land, or clayey loam, on a clayey subsoil; if your soil is wet, drain and surround the bulb with sand; wet produces rust, which soon burns the foilage and plants; when in favorable soil, the bulbs often produce two or three spikes of blossoms, giving a great quantity of blossoms for several weeks.

When the bulbs are lifted and dried, remove the bulblets which will be found at the base; put these bulblets in dry paper bags, and lay them aside for at least a year; then plant in pots in the fall, or in the earth the succeeding spring, and you will get plants which will, at maturity, give the same variety as the parent; by the bulbs, therefore, we may produce like, and by seeds unlike varieties.

The list of beautiful species is numerous; and, as they are constantly changing by new seedlings, no list can be of permanent value. I shall therefore only give names of twelve. Their colors will enable the amateur to select according to the effect he may wish to produce. Planted in the beds of city areas (see pp. 880–9), as succession to spring bulbs, I think they would be equal to any bedding plants.

1. Ceres, pure white and purple.
2. Napoleon III., bright scarlet, striped.
3. Brenchlyensis, vermilion-scarlet.
4. Solfaterre, pure yellow.

5. El Dorado, pure yellow.
6. Ophis, yellow, spotted with purple.
7. Pluton, deep scarlet, spotted with white.
8. Hebe, carnation, striped with carmine.
9. Madame Vilmorine, rose, white centre, striped with carmine.
10. Purity, pure white, lower petals marked with rosy-violet.
11. McMahon, cherry-orange (very bright).
12. Azlaie, salmon-rose, shaded.

Gladiolus Byzantinus, Communis and Roseus are sufficiently hardy to be planted in the autumn, and, well covered, will come up and blossom in the spring.

Hyacinths have always been favorites as spring bulbs, both in the garden and the house. New varieties are yearly introduced to replace those which have deteriorated; for even when the bulbs are carefully taken up each spring, after flowering, and replanted in the autumn, they seem to lose vigor, making it necessary for those who would keep up with the times to purchase new bulbs or propagate for themselves.

The precautions are to have rich, loamy, well-drained soil, and, as with the Gladiolus, to surround the bulb with sand if the land is inclined to much moisture. Where Hyacinths are left in the ground unremoved for several years, they will continue to blossom, but less perfectly each year, as the tendency of the bulb to make offsets increases, and at last the offsets consume the parent; these offsets, taken and treated like the full, grown bulb, will in time produce perfect flowers of the same species.

To all these bulbs the same rule may be applied: if you desire to surpass in the quality of your flowers, you may make a soil just suited to them, — and all require about the same, — an equal mixture of loam and cow manure and one-quarter common sand. These bulbs are grown in the house in the winter, in rather deep and narrow pots about four inches in diameter, with good drainage, made of broken charcoal, soil like that just described. Set bulb in sand, and cover top one half-inch deep; as they grow, move in to the light. Occasionally the bulbs may be watered with nitrogenous guano-water or any other form of ammonia; when in bloom give plenty of water.

When Hyacinths are grown in glasses, be sure to use dark colored glass, and change the water sufficiently often to keep it pure; if the roots get slimy, the slime should be removed and the water changed; pieces of charcoal in the water help keep it pure, and you may add very little guano or ammonia to the water to stimulate the plants. Set the bottom of the bulb one-quarter of an inch above the water; keep them in the dark until the roots get a couple inches long, then remove to the light. After Hyacinths have blossomed, either in pots or glasses, you must be very careful to dry them thoroughly, and then lay them aside to be planted in the ground next autumn; but they seldom blossom as well a second time, though after a year in the garden the bulbs recover much of their size and firmness.

The same objection applies to lists of Hyacinths as to Gladiolus. The subjoined list of twelve varieties is made by R. McCleary Copeland, who has been for many years a very successful exhibitor of Hyacinths before the Massachusetts Horticultural Society.

Lord Palmerston, grayish blue, shaded with purple.
Robert Fortune, reddish pucy-mauve.
Thorwaldson, bright azurean blue.
Josephine, rich crimson.
Von Schiller, deep red, striped.
Macaulay, deep rose-pink, full centre.
Ida, clear yellow.
Heroine, yellow.
Crœsus, deep yellow.
Sultan Achmet, white.
Mont Blanc, white.
General Cavaignac, white.

I could easily fill pages with detailed descriptions of different bulbs, the treatment varies but little, all wanting attention, rich, dry, light soil and good drainage, and earnest amateurs will soon find what particular care each variety requires to bring it to perfection. I can safely say that there is no variety of plants which will not compensate the cultivator who brings them to their perfect condition.

Many of the tender Cape bulbs would become acclimated if suf-

ficient care should be taken with them. Mr. Sargent, in his very thorough appendix to Downing's Landscape Gardening, describes the careful experiments he has tried in acclimating tender and half-hardy evergreen and deciduous trees and shrubs; planting them, in the first place, in sheltered situations, the first winter he would surround them with boxes and straw, the second with straw and canvas, the third with canvas, and at last leave them unprotected. In some such manner he has brought several specimens to endure a temperature which would have been fatal at first.

Such experiments teach a lesson of value: we cannot make any given bulb more hardy by planting it year after year, but we may produce seedlings which in a few years would become hardy. The beautiful Cape bulbs, now only fit for the greenhouse, or the heated and protected border, to be started in pots under glass and removed to shelter before winter comes, would be very much more valuable if we could treat them like Hyacinths or Tulips; as there is sure to be trouble and vexation in every horticultural operation, and every effort should be made to reduce the sources from which trouble and vexation are liable to arise.

Cyclamens are very charming little plants, the most patient and enduring bulbs we can have in the greenhouse. There are many species which are very tender and fit only for the greenhouse, whilst there are others which in England are as hardy as the Crocus, such as C. Coum, C. Europæum, C. Ibericum, C. Lalifolium, C. Linearifolium, C. Littorale, C. Neapolitanus, C. Verum; being hardy there, it only needs patience to acclimate them or their seedlings here.

These plants offer as good a field for the amateur florist as the Gladiolus did a few years since; and to show what are the elements necessary to commence their culture, I will give a brief account of the English method. "It would be folly to deal with hardy Cyclamens as we deal with most other hardy spring flowers, because, if exposed to all the rigors of the early season at which they bloom, nothing but disappointment is to be expected." Those who grow Ixias, Sparaxis, and other of the newly hardy Cape bulbs out-of-doors are in just a proper position to do justice to hardy Cyclamens. A border facing south, sheltered with a back wall or greenhouse, or enjoying some of the surplus warmth from a

stove or furnace, and consisting chiefly of peat and leaf mould, in a warm and well-drained subsoil, is the place for Cyclamens, Tritonias, Ixias, the hardy Amaryllises, Alstrimerias, and myriads of the choicest flowering-plants known, which need not so much the help of artificial heat, as moderate protection against the scathing blasts and perishing sleets of our spring. We can promise our readers who will make up a border for plants of the kind first named, an amount of enjoyment far surpassing all that they have ever derived from the pursuit of gardening according to the established plan of making a grand summer display, and devoting every possible energy to the development of the bedding system.

If the position is well drained, all that hardy Cyclamens require is a mixture of turfy peat, leaf mould, and yellow loam, equal parts: this must be eighteen inches deep; and, when the bulbs are planted, cover them with two inches well-rotted dung. Plant in October, and take up and replant every succeeding October; plant in a little sand, and set C. Coum an inch below the surface; the others press in slightly like onions; cover the bed in "winter with four inches of tan."

The varieties of greenhouse Cyclamens must be refused water as soon as out of bloom until the leaves turn yellow; then keep the plants moderately dry until you wish to start them anew.

The Cyclamen will ripen seed freely, which easily germinates when sowed in rich earth; they will blossom in three years from seed. In our hot summers the bulbs might dry too much, which can be prevented by setting them in a box of loam or trench, where they could be occasionally moistened; this would keep the bulbs full and plump until wanted.

This English advice is not directly applicable to this country, but it teaches the direction in which our efforts should be made. The same reasoning applies to the other Cape bulbs, and I believe that in the small and protected gardens of city areas, warm borders under hedges, and indeed whenever there is sufficient interest to provide good quarters, we may hope to propagate seedlings of these plants which will become in time perfectly hardy.

The Tuberose is another illustration of the rewards bulbs will give the patient cultivator. It is a most beautiful flower, and deli-

ciously fragrant. Their qualities have induced many persons to try to grow them in the open ground, but with little success; when they received the best skill of nurserymen, only about half the bulbs could be made to blossom, throwing up stalks with fifteen to twenty blossoms on them.

Mr. E. W. Buswell, an enthusiatic admirer of flowers, living near Boston, tried tuberoses year after year, and found that the purchased bulbs would rarely throw up flower stems, although they made many small bulbs as offsets. This awakened his curiosity, and induced the belief, that if he should remove all the offsets, and every appearance of them, by gouging out the eyes which could be seen on the bulb, that he could drive the vigor of the bulb into the flower stem. He according purchased some new bulbs, carefully selecting those which were hard at the top, showing that they had not blossomed the preceding year, and which showed neither scars of old offsets, nor many indications of new ones. Knowing that roots must precede the leaves, and that the more roots at first, the more vigorously the flower stems would push when they should start, he prepared a compost, as directed on p. 809 ; he selected medium-sized pots, and filled them one quarter full of broken, very dry cow manure, picked up in the pastures; over this he placed the loam, and planted his bulbs; to promote growth at the roots, he set the pots in an active hotbed, watered them moderately, and covered them from the light. As soon as the point of the new growth began to appear through the soil, and he found that the roots had got to the manure, he gave water freely, admitted light, and kept the plants covered with glass; in this warm and moist air, they pushed rapidly, and soon required to be set in deeper frames to give the ascending stalks more room; he continued to water freely, and when the weather got warm enough, transferred them to an old hotbed frame in the open air, where the plants blossomed abundantly, eighty per cent blossoming, giving thirty blossoms on a stalk. During the entire growth, he watched for offsets, and, on their first appearance, pushed his knife down, and cut them off so that the bulb had nothing to do but blossom.

This success shows what can be done. Doubtless, the tuberose, started in pots in the house, in April, would, with attention, be

ready to go into the open ground by June. Set them over some fermenting horse manure to give a little bottom heat, and water if the weather should be dry, a very fine bloom may be expected, not so large a percentage as Mr. Buswell got with his hotbeds, but sufficient to repay all the care and trouble.

The following list of perennials, bedding plants, and annuals was prepared by Mr. John C. Hovey, of Cambridge, and member of the Flower Committee of the Massachusetts Horticultural Society. The plants and flowers here mentioned can be relied upon as being really the best for a small collection: —

TWENTY-FIVE BEST PERENNIALS.

Aconitum Japonicum.
Adonis vernalis, yellow.
Caltha palustris, fl. pleno, yellow.
Campanula carpatica, blue.
Campanula persicœfolia, alba plena (white).
Clematis erecta, white.
Delphinium formosum, deep blue.
Dielytra spectabilis, rose and white.
Epimedium macranthum, white.
Genista Siberica, fl. pleno, yellow.
Gypsophila paniculata, white.
Helleborus Niger, white.
Iberis saxitile, white.
Iris superba, light blue.
Lathyrus latifolius, dark rose.
Lychnis, viscaria, fl. pleno, red.
Orobus verna.
Papaver Orientalis.
Ranunculus aconitefolius, fl. pleno.
Salvia azurea, blue.
Sedum denticulatum, red.
Spirea filipendula fl. pleno, white.
Spirea japonica, white.
Trillium grandiflorum, white.
Yucca filimentosa, white.

BEST TWELVE NEW PERENNIALS.

Arabis lucida, variegata.
Clematis erecta, fl. pleno, white.
Dielytra spectabilis alba, white.
Doronicum caucasicum, yellow.
Gaillardia grandiflora.
Iberis tenoreana, purple.
Orobus, verna rubra, red.
Pentstemon grandiflora, lilac.
Phlomis abasicus.
Platycodon grandiflorum, blue.
Tradescantia pilosa.
Verbena montana

TEN BEST PHLOXES.

Augustin Lierval, white, with crimson eye.
Julie Roussel, white, carmine eye.
La Volupte, dark crimson.
Madame Marseau, white, purple eye.
Madame Suer, white, crimson eye.
Triomph de Twickel, white, and crimson stripe.
Madame Vilmorin, crimson, dark eye.
Madame Lierval, violet and crimson.
Madame Rougiere, white, rose eye.
Madame Henricq, rose.

BEST TEN HERBACEOUS PÆONIES.

Festiva maxima.
Rosea lutea.
Victor Leman.
Madame Vilmorin.
Comtesse de Morny.
Camille Caillot.
La Negres.
Lutisciana.
Officinalis pleno.
Tenuifolia pleno.

BEST TEN TREE PÆONIES.

Banksia.
Athlete.
Alba plena.
Carnea plena.
Fragrans.
Maxima plena.
Ottorius.
Rosea odorata.
Splendissima.
Triomphe de malines.

BEST TEN DAHLIAS.

Loveliness, white, tipped with purple.
Lord Palmerston, crimson and scarlet.
Mrs. Turner, corn color and yellow.
Peerless, golden-yellow.
Triumphe de Peck, dark maroon.
Mrs. Pressley, white and purple.
Gold-Finder, golden-yellow.
Pioneer, deep scarlet.
William Dodds, deep yellow.
Miss Watts, white.

BEST TEN CHRISANTHEMUMS.

Golden Hermione, golden-orange.
Golden Trilby, fine yellow.
Lady Hardinge, light rose.
Chevalier Domage, deep yellow.
Mrs. Slade, fine white.
August Mie, carmine, tipped with yellow.
Progre, rich crimson.
Le Phare, deep red.
Little Harry, golden-amber.
Gold queen, sulpher yellow.

BEST TEN POMPONE CHRISANTHEMUMS.

Bob, deep maroon crimson.
Stella, golden-yellow.
Solfaterre, light yellow.
Nelly, white, yellow centre.
Bernettianum, white.
El Dorado, golden-yellow.
John Salter, orange red.
Henrietta, blush.
Rose pompone, rose color.
Sunset, dark orange.

TEN BEST NEW ANNUALS.

Coreopsis coronata.
Callirhoe pedata.
Aster, Dwarf Chrisanthemum, fl. pl.

Dianthus heddewigii.
Nasturtium, Tom Thumb.
Portulaca, double.
Palafoxia Hookerina.
Whitlavia grandiflora alba.
Tagetes, signata pumila.
Zinnia, new double.

BEST TEN NEW VARIETIES OF VERBENA.

Blue king, light blue.
Sunset, rosy scarlet.
Decorata, scarlet.
Blue flag, blue and white striped.
Sir Harry, rich purplish blue.
Boule de nege, pure white.
Lucy Gray, crimson, yellow centre.
Miriam, pink and white striped.
Bouquet, blush, crimson centre.
Victor, light scarlet.

BEST TEN PETUNIAS, SINGLE.

Countess of Ellsmere, dark crimson.
Union flag, striped.
Striped Gem, striped.
Wyoming, crimson, white blotched.
Evening Star, dark, veined with maroon.

DOUBLE VARIETIES.

Rubra pleno, crimson.
General McClellan, crimson, white blotched.
Alba Magnifica, white.
Bostonia, purplish-crimson.
Viola, blush.

The following list of picotees and carnations was prepared by Mr. James McTear, of Boston, who has made these plants his speciality: —

BEST EIGHTEEN CHOICE CARNATIONS.

Apollo.	Lady Peel.
Lively Ann.	Mayor of Nottingham.
Admiral Curzon.	Splendor.
Christopher Sly.	Tenby Rival.
Royal Scarlet.	James Kirtland.
William IV.	Sir Joseph Paxton.
James the Second.	Fanny Garden.
Merrimack.	General Simpson.
Lord Gooderich.	Queen Boadicea.

BEST EIGHTEEN VARIETIES PICOTEES.

Rosetta.	Mrs. Norman.
Princess Helene.	William Summers.
Jemima.	Sultana.
Mrs. Holbeck.	Countess.
Finis.	Prince of Wales.
Prince Albert.	Mrs. Dodwell.
Ada Mary.	Mrs. Lochner.
Cedo Nullii.	Mrs. Hovey.
Ophelia.	Parsee Bride.

BEST EIGHTEEN HOLLYHOCKS.

Acme.	Macrantha.
Warrior.	Princess.
George Young.	Prince of Wales.
Princess.	Lucifer.
Minerva.	Chrysolite.
Decision.	Hesperus.
Rev. J. A. Dix.	Cynthia.
Invincible.	Lady Dacres.
Carus.	Queen Victoria.

The following list of roses is recommended by Mr. Francis Parkman, of Jamacia Plain, near Boston, as having been grown by him, and are adapted to our climate. The most of them will be found in the list of roses, on pp. 611 to 622, "Country Life," with their colors and habit described: —

Moss, Reine blanche, pure white, large and full.

SIX CLIMBERS.

BOURSAULT, — amadis, crimosa.
AYRSHIRE, — ruga, splendens (needs protection in exposed situations in winter and spring).
EVERGREEN, — félicité perpetué, (cover).
PRAIRIE QUEEN.
BALTIMORE BELLE.

HYBRID PERPETUALS.

Auguste Mie, fl. pleno.
Baronne Prevost, fl. pleno.
Caroline de Sansel, fl. pleno.
General Washington.
General Jacqueminot, fl. pleno.
Gloire de Santenay.
Jules Margottin.
La Reine, fl. pleno.
Lord Raglan, pleno.
Maurice Bernardin, fl. pleno.
Sensteur Vaisse, fl. pleno.
Souvenir de Reine d'Angleterre.
Triomphe de l'Exposition.

BOURBON ROSES, — NOT ABSOLUTELY HARDY.

Blanche Lafitte.
Dr. Berthet.
Dupetit Thouers.
George Peabody, fl. pleno.
La Quintrine.
Monsieur Jard.
Prince Albert.
Reveil.
Sir J. Paxton.
Souchet.
Souvenir de Malmaison, fl. pleno.
Louise Odier (these are especially autumn roses).

CHINESE ROSES.

Archduke Charles.
Cels Multiflore.
Cramoisie Superieure, fl. pleno.
Eugene Beauharnais.
Fabvier.
Madame Breon.
Madame Bureau.
Mad. Bosanquet, fl. pleno.
Carmine Superb.
Napoleon.
President d'Olbecque.
Prince Charles.

These roses are most valuable for planting in masses or in beds, where succession is wanted.

List of perennials especially recommended by Mr. Parkman.

Achillea, ptarmica, double white.
Aconitum versicolor, variegated blue and white.
Aquilegia Alpina, blue and white.
Aquilegia formosa plena, blue and maroon.
Betonica grandiflora, rich purple.
Cerastium tomentosum, pure white.
Delphinium formosum celestinum, white and sky-blue.
Dianthus florii, deep rose.
Dielytra spectabilis, red and white.
Funkia Sieboldii variegata, blue variegated leaf.
Gloxinia flowered Digitalis, white, with black and purple spots.
Iberis caridifolia, pure white.
Lychnis Haageana, scarlet and red.
Lychnis viscaria splendens, deep vivid red, double.
Platycodon grandiflora, blue, very large, drooping bells.
Platycodon Wahlenbergia, white, very full.
Pyrethrum Carneum, flesh-color, yellow centre.

CHAPTER III.

KITCHEN-GARDEN.

THE most important improvement connected with the kitchen garden, is the publication of "The Field and Garden Vegetables of America," by Fearing Burr, of Hingham, Mass. This is the most valuable contribution to horticultural literature for many years. Mr. Burr has not only collected into one volume a careful description of all the vegetables which can be cultivated in this climate, but has grown most of them himself; so that we know that his judgment upon any particular variety is formed upon actual experience.

We have long needed such a book, because the diversity of climates and soils in this country permits the cultivation of a great variety of fruits and vegetables; and yet but few persons can hope to know all the plants they might profitably cultivate. In this book of six hundred and forty pages, the reader will find all the genera of vegetables, and most of the species, with their character, value, and methods of culture, carefully described.

Mr. Burr disagrees with the direction given in p. 625, "Country Life," where the cultivator is directed not to tie up his tomato-plants, but to leave them on the ground until they are well grown, and then to work some meadow hay under them to protect the fruit. This practice is certainly the best in field culture, as obviously to make trellises or supports for an acre or two of tomatoes would be more troublesome and costly than the profit of the crop would warrant. In his article on the tomato, he advocates confining the vines to trellises, as a means of hastening the maturity of the crop.

This seems very reasonable; and as it is of the utmost importance to get tomatoes early, where early fruits may be expected, I will quote his directions for forcing the crop on p. 640: "The ripening of the fruit may be hastened by setting the plants against a south

wall or close fence: as the plants increase in size, they must be nailed or otherwise attached to the wall or fence; and, if the weather be dry, liberally watered. When the first two trusses of bloom have expanded over each shoot, the shoot should be stopped by pinching off the portion which is beyond the leaf above the second truss, and no more lateral shoots should be suffered to grow; but the leaves must be carefully preserved, especially those near the trusses of bloom. The number of trusses on each plant will vary with the strength and vigor of the particular plant; but three or four will be quite enough, leaving about half a dozen trusses of fruit."

"As the fruit ripens, it must be well exposed to the sun. There will be nothing gained by allowing a great many fruit to ripen: the number above given will be sufficient, and the tomatoes will be much earlier and larger than if they were more numerous."

By growing them on trellises or within loops, supported by stakes, the vines can be more easily controlled, and the fruit more readily gathered.

The best varieties are, for general field culture, the large red tomato: this is the most productive variety, but not so early by a fortnight as White's Extra Early. "The plants are moderately vigorous and readily distinguished by their peculiar, curled, and apparently withering foliage. In order to retain this or any other early variety in its purity, seed for planting should be saved from the smoothest, best-formed, and earliest-ripened fruit."

In strawberry culture, there has been no material change. The practice recommended on p. 735, "Country Life," of growing it as an annual crop, is increasing, and is universally advocated by market-gardeners near Boston. Nor is there very much change in the varieties about Boston for market: Hovey's Seedling continues on the whole the favorite. Wilson's Albany, though more prolific, is too sour to be desirable, and the Jenny Lind lacks firmness of berry to stand transportation.

Mr. W. H. Locke, a well-known market-gardener of Belmont, Mass., the headquarters of successful strawberry culture in New England, gives the following list of the strawberries cultivated in Belmont: —

Jenny Lind; Early Virginia; Cutter's Seedling, a good bearer, hardy, but fruit too soft for market; Brighton Pine, a fine berry, but difficult to cultivate; Wilson's Albany; Hovey's Seedling; Jenney's Seedling; Austin's Seedling; Triomphe de Gand; La Constante.

The two latter are generally conceded to be the best of the imported varieties. Mr. Locke recommends for three varieties, Jenny Lind, Hovey's Seedling, and La Constante, ripening in the order in which I have named them; La Constante exceeding the others in sweetness and flavor.

A new berry, widely disseminated and highly praised, The Agriculturist, has not yet been sufficiently tried to enable one to speak definitely of its qualities; it is claimed to be the best new strawberry: as there are many beds of them which will fruit this year, its merits will soon be known.

Currants have been improved by two seedlings of Mr. Dana, of Roxbury; but, for general use, the old Dutch currants continue to be favorites. There has been little change in the other small fruits: each year gives new varieties; but there is no need to discuss them here.

The profit attending the culture of the small fruits is strongly brought out in a report of the New-Jersey Fruit-growers' Association, published in 1864.

This report gives the number of acres under strawberries in three towns, Burlington, Chester, Cinnaminson, as three hundred and fifty-four; yielding 12,596 bushels strawberries, which were sold at the average price of three dollars and sixty cents per bushel.

"Two hundred bushels have been raised to the acre under favorable circumstances; the common error is, not adapting the variety to the soil. Early Scarlet, May Queen, Iowa, Denner's Prolific, succeed well in light sandy soil; Triomphe de Gand, Scarlet Magnate, Lady's Finger, require rich and heavy soil. Set the vines, eighty thousand to an acre, beds three and a half feet wide, plants twelve inches apart, in rows five inches apart, eighteen inches between beds."

They give the yield of raspberries on forty acres as an average of thirty-three bushels to the acre, sold at four dollars and sixty-

four cents per bushel. The varieties grown were Old Purple Cane, two kinds Allen, Kirtland, and Black.

There were ninety-nine acres of blackberries, yielding an average of fifty-three bushels to the acre, sold at three dollars and thirty cents per bushel; varieties grown were New Rochelle and Dorchester.

An interesting fact elicited in connection with market-gardening is, that of all engaged in that occupation, twenty-five per cent get rich; twenty-five per cent make a living; twenty-five per cent just get along, and the remainder fail. There is no other occupation, not even general farming, which gives so favorable a return to those who follow it.

CHAPTER IV.

ORCHARD.

THERE is little to say about the orchard, although there is no branch of my subject which possesses a wider interest. Near Boston, cultivators, having met with so many discouragements in peaches, gave up their general culture; but a few who have observed the theories and directions given in "Country Life," pp. 296–299, have found the peach steadily improve under their hands: and, during the past year, the peaches shown at the Boston Horticultural Society were as fine as in the good old days, when every garden could boast of its abundant and perfect fruit. Throughout the West, the peach-crop failed. Occasional failure of peaches from late frosts, and from early warm weather in the spring, must ever be expected; but where cultivators are careful to get healthy trees, and take good care of them, the peach will be found, one year with another, a very profitable crop.

In Eastern New England, the apple-tree has been so infested with canker-worms for several years, that it seems almost impossible to secure a reasonable yield of fruit; and farmers are in many cases cutting down their trees to cultivate pears, grapes, and vegetables: but through the rest of the country, the apple continues to pay the grower perhaps better than any other kind of fruit. The lists already given of apples are as well suited to general culture as any. A meeting of eminent fruit-growers, in New York, to decide to what varieties of fruit the Greeley prizes should be awarded, gave the first premium, of a hundred dollars, to the Baldwin Apple. As the best six apples after the Baldwin for general culture, —

For *Summer* — Red Astrachan, Primate.
Autumn — Gravenstein, Porter.
Winter — Northern Spy, Hubbardston.

The same committee awarded the first prize for pears to the Bartlett. Best six —

For *Summer* — Manning's Elizabeth, Rest.
Autumn — Shelden, Seckel,
Winter — Lawrence, Hovey.

This committee of eight gentlemen, from different parts of the country, in making these selections were obliged to leave out many first-rate varieties of fruit. They first agreed upon the points of excellence which a fruit should have to make it perfect; and then classified the fruits in the order in which each variety covered the greatest number of these points. The result of their vote showed, that, in the judgment of the committee, no collection can be complete which does not comprise at least twenty-four varieties of pears.

In conclusion, I will give two receipts for grafting wax, which have been found very valuable by many persons.

DR. WARD'S RECEIPT. — One part of tallow, two of wax, four of rosin; if too stiff, add tallow; too soft, rosin; keep bottled, and apply with a brush.

WATSON'S RECEIPT. — Two parts of rosin, two of black pitch, one of white turpentine, one of tallow, one of beeswax; apply when melted with a brush; keep warm when using, in a bottle or jar of hot water.

LIQUID GRAFTING WAX. — One pound rosin, five ounces ninety-five per cent alcohol, one ounce beef tallow, one tablespoon spirits turpentine; melt the rosin over a slow fire; then take from the fire, and stir in the beef tallow with a perfectly dry stick or wire; when cooled, add spirits turpentine, and last, the alcohol, in small quantities, stirring constantly; if the alcohol cools too much, so that a lump forms, reheat until it melts. Keep it in a corked bottle, and lay it on with a brush.

CHAPTER V.

GRAPERY. — GRAPES, AND HOW TO GROW THEM.

I DO not intend to devote any space to the culture of grapes under glass, as the directions previously given are sufficient; but the interest in the culture of out-of-door grapes has greatly increased: in every village there are many who now grow them for their own use or the market, and very many vineyards have been planted in different parts of the country in order to make wine.

In California, grape culture and wine making seem as certain as any other kind of cultivation, whether owing to peculiarities of atmosphere or rarity of rains; but east of the Rocky Mountains, the vine has suffered from a variety of enemies, which have proved in some cases too powerful to be overcome, until many vineyards have been pulled up, and the soil devoted to other purposes.

Immense efforts have been made, and are now making, to find or produce some grape which will be hardy in all sections of the country, not liable to mildew and rot, and which shall be sufficiently spirited for the table and sweet for wine. Several grapes have been propagated which it was hoped would prove all that could be desired, and have been very extensively sold; but none has yet proved equally valuable in all parts of the country. If such a grape can be found, it will be an incalculable benefit to the country; but I think our cultivators ask too much, and have set too great a stint for themselves.

No one grape has ever been the favorite in Europe, where there are a great variety of wines of entirely different qualities, and made from very dissimilar grapes. Some of the best wine-grapes prove very inferior for the table.

Our country affords very dissimilar soils and climates for the vine; and if man, with his infinite capability of self adaptation,

finds it so difficult to move from the east to the west, and continue in the same health and vigor, do we not make an unreasonable demand on the vine.

The grape which would be perfectly satisfactory in the cool, changeable climate of New England, where we rarely have a hot moist interval in summer, so very common in Cincinnati, would find itself unable to contend with the Ohio climate; whilst, on the other hand, a grape which would find in the long, hot summer of the West the time to develop and perfect its sugar, and to ripen its wood, would be crude and unripe here: it might make a fine wine on the Ohio, and a poor vinegar in the environs of Boston.

Grapes have two distinct uses, — to be eaten, and to make wine; and their value as a crop in any locality depends on the manner in which they are to be consumed. Near cities and large towns, they are most valuable for the table. At five cents per pound net, grapes will sell in any city, if well grown and ripened, faster than they can be brought into the market. It is the rarest thing that we can buy a nicely flavored and well-ripened grape in our markets: there are plenty of sour, ill-ripened grapes, which are sold at five, ten, fifteen cents per pound, whilst the perfect article can rarely be purchased at any price.

Supposing that a gardener should establish a vineyard solely to grow table-grapes; grown to stakes or espaliers by any good method the fruit will average, when he gets a crop, ten to twenty-five pounds per vine, which at five cents per pound, and this generation will not see well-ripened, good quality of grapes at a less price, would give at least eighty-four cents net per vine.

Setting the vines one to every forty-eight square feet would give nine hundred vines to the acre, or a net profit, under favorable circumstances, in grapes of seven hundred and fifty-six dollars per acre. Such calculations and realizations as these are very tempting, and certainly enough to stimulate an immense culture. And it is to the fact that men have made money in grape-culture that we owe the increased interest in new varieties of the grape.

With these figures before their eyes, men have established vineyards with the reasonable belief that a great deal of money could be made; and, when the heavy first-cost of starting the vineyard

has been incurred, it is a great sorrow as well as loss to have the crops cut off by some insidious disease.

Every new vine is asserted to have all the required virtues, and to be exempt from disease; but in time it is found but little better than its predecessor. When the first edition of "Country Life" was prepared, the interest in grapes was commencing, and the "Concord" was the great favorite; every thing was predicted for it: but so many fine grapes have been since produced, that it is difficult to decide which is really the best.

In order, if possible, to ascertain what grape or grapes are really best for general culture in the Northern and Western States, and to enable me to succinctly state the most important facts about the vine and its culture, before commencing to write this article, I wrote to many of the leading cultivators of the grape in all parts of the country, asking them the same questions, as to best varieties, frequency and cause and cure of mildew and rot, best soil and method of pruning, and other similar questions. I have received a large number of replies embodying the most important information from Mr. Huseman, Hermann, Mo.; Mr. Huidekoper, Meadville, Penn.; Mr. Meehan, Philadelphia, Penn.; R. A. Grider, Bethlehem, Penn.; J. A. Deliot, Sing Sing, N. Y.; R. Buchanan, Cincinnati, O; Dr. Grant, Iona Island, N. Y.; Professor Silliman, New Haven, Conn.; J. Fiske Allen, Salem, Mass.; W. C. Strong, Brighton, Mass.; and E. A Brackett, Winchester; and the views which I shall give in the following pages are those in which all these gentlemen, or a majority of them, coincide. I do not propose to write a minute treatise on the vine, its propagation, profits, diseases, &c. I have no space in which to do so, nor does the able treatise of Mr. Andrew S. Fuller of New York leave much room for a new comer; for the same reason, I cannot enter into any extensive discussion of varieties and various methods of treatment. I shall confine myself to the general plan of this book, and give a simple statement of what I esteem to be the best method of cultivating the vine, a summary of the facts about its diseases, &c., and the most valuable varieties in which, as I have said before, these distinguished cultivators coincide.

Many varieties of grape have been discovered which blossom

late enough, and ripen early enough, to escape frost; so that the chief enemies to grape-culture are black rot and mildew. The rot is more injurious at the West than the East; but, wherever it exists, it is attributed to excessive moisture, either at the root, or in the atmosphere, and to sudden changes of temperature. It is nearly sure to come with a hot, moist condition of the air; and when these periods occur at the West, in the infancy of the berry, the crop is sure to be lost. There seems to be no cure for the disease, other than planting vines on high and dry land, and selecting those varieties of grapes whose constitution will not be affected by it. Different grapes in the same vineyard will be affected differently, some varieties escaping entirely, when all the rest are ruined; and singularly enough the grape ruined this year may escape next. The natural precaution is to plant in each vineyard several varieties of grape, selecting those which common experience has most often shown to have escaped the destroyer. In the East we are but little troubled by black rot. Professor Silliman finds the Catawba and Isabella rot in New Haven; Mr. W. C. Strong, the Catawba and Concord, in Brighton, Mass.; and J. Fiske Allen, the Diana, in Salem, Mass.; but these agree with other cultivators, that, at the East, the rot is not as yet a dangerous enemy. In Missouri, Mr. Huseman complains of the Catawba, Isabella, Garugués, and To Kalon, as most subject to rot and mildew; Mr. Buchanan, of the Catawba, Delaware, Norton, and Ives; Mr. Grider, Bethlehem, Penn., finds Concord, Maxataway, and Clinton very great sufferers, whilst the Franklin escapes from disease. On the Hudson at Sing Sing, Mr. Deliot finds Catawba, Anna, and Concord most injured.

The West has suffered more because vineyards have been more extensively planted in that region, but every cultivator at the East has lost his crop at some time by blighting diseases. Mr. Grider states that vineyards frequently escape both mildew and rot for several years; but at last their time comes nearly irrespective of locality and varieties of grape. Mildew seems to act very capriciously, attacking some plants standing near to each other in a vineyard, and leaving others of the same variety, equally near each other, untouched; sweeping off all the fruit from some variety, and leaving all of another uninjured; whilst the next year it will affect the vines left uninjured this year, its former victims escaping.

What all the causes of mildew are is not yet ascertained, though some and the worst are well known. All agree that sudden changes of temperature, unequal currents of cold or warm air, radiation from the leaves of the plants at night when the temperature becomes unusually cold, standing water about the roots of the plants, badly drained land, are sure to cause mildew; or at least plants exposed to these conditions always suffer from mildew.

It is possible, in the cold or warm grapery, when the vines are growing rapidly and the temperature is high, to produce mildew in a few hours by leaving the sashes open so as to bring rapid currents of cold air over the surface of the leaves, but mildew under glass may be checked and removed by the free use of sulphur dusted over the leaves, and exposed on the flues. Brushing the vine over before it commences to grow with a mixture of sulphur and lime-water is found to be very beneficial. Under glass, none but careless persons need suffer from mildew; but sulphur applied out of doors is of doubtful benefit, for in the open ground we cannot control the currents of air.

Professor Silliman, reasoning from the effects of cold currents of air in graperies, and from the fact that vines growing on fences or house walls rarely mildew where there is a projecting roof over them which moderates nocturnal radiation, believes that this disease can be controlled by planting vines against such supports as will enable us to throw out a light roof or shelter over the top of the vine, thus checking or retarding upward currents of air, and reducing the radiation. This would be beneficial, but it does not cover another class of causes. Mr. Allen of Salem has frequently found grapes out of doors ruined by mildew after being enveloped for twenty-four hours in a dense fog, against which no projecting roof would be any defence.

Others of the gentlemen I have referred to have found that those vines are sure to be the victims of mildew which are of weakly habit of growth, whether produced by over-pruning, overbearing, moisture, sterility of soil, or currents of air; and here I think lies the root of the matter, — mildew is a consequence of enfeebled vitality; the seeds or spores of this fungus are always floating in the air, ready to take root and develop whenever a suit-

able soil is ready for them: we all know that any vegetable matter laid in a damp and ill-ventilated place will become mouldy very quickly. Vegetation suffers from fungitic growth, whenever any cause renders it sickly, weakens its vitality, suddenly checks its vital processes, whether currents of air, nocturnal radiation, or excessive moisture. As soon as the vine ceases to progress or maintain its integrity, it commences to decay; for growth and decay are simultaneous processes in all living matter, the animal absorbing oxygen and giving out carbon at the same time, and the plant doing just the opposite. When therefore from any cause you check the advancing processes of vegetation, you uncover the decaying processes to the seeds of the fungus, which is mildew or mould. If the vine's progress is but momentarily arrested, it may start on again, and suffer but little, its leaves perhaps become spotted; but, if the adverse condition is continued long enough, the leaves and fruit are both blighted.

We therefore see that there are two methods for us to pursue with the hope of ultimate success: first, so to arrange the vineyard that its aspect, shelter, soil, moisture, shall afford to the vine a perfect condition of health; second, as we can rarely insure all these conditions, we must try to produce vines of such varieties as shall have particularly hardy constitutions, and be in themselves able to resist adverse influences.

It is a mistake in growing new varieties, which we may hope will be able to resist mildew, &c., to suppose that the wild grape of any portion of the country is the best stock to commence with, because sometimes wild grapes suffer from these diseases, quite as much as cultivated; during the last year, for instance, wild grapes in many parts of the country were entirely cut off by mildew. We must follow the same plan which cultivators of other plants have proved to be the best, propagate from the best cultivated varieties you can get, for cultivation brings with it new diseases and conditions, and the best cultivated varieties will have overcome many dangers, which will threaten new comers from the field and forest.

These considerations enforce the importance of seeking new varieties of grape adapted to particular localities; the climate of the East may be expected to attack vines from the West, and *vice*

versa; and, whilst we may reasonably expect to produce a vine perfectly adapted to one district where the conditions are always relatively the same, it is almost impossible to believe that one can be found whose constitution can equally resist the unfavorable influences of climates and atmospheres of widely separated localities.

I will now give a list of the grapes which the gentlemen I have referred to believe to be the best for the part of the country in which they reside. The following are the six grapes on which the greatest number of persons have united; perhaps if a still larger number of persons were consulted the verdict might be different; but these gentlemen are well-known authorities in horticulture, and their opinion is as likely to be fair as that of any other set of men.

1. DELAWARE — Grant, New York; Silliman, Connecticut; Strong, Allen, Brackett, Massachusetts; Huidekoper, Pennsylvania; Huseman, Missouri; a qualified commendation, Meehan, Deliot, in rich soils, Buchanan (10).

2. CONCORD — Silliman, Huidekoper (thinks it vigorous, prolific, but crude), Huseman, Meehan, Deliot (in poor soil), Grider, Buchanan (7).

3. IONA — Grant, Silliman, Strong, Allen, Brackett, Deliot (all Eastern men), (6).

4. DIANA — Grant, Strong, Allen, Huidekoper, Meehan (5).

5. ALLEN'S HYBRID — Silliman, Strong, Allen (Eastern) (3).

6. CREVELLING — Strong, Brackett, Meehan (3).

CLINTON — Meehan, Deliot (poor soil), Grider (Middle States).

HARTFORD PROLIFIC — Silliman, Huseman, Grider.

This tabular view shows us that the Delaware is a favorite in all parts of the country, to which may be added the opinion of Mr. Fuller, who in his "Treatise on the Grape" says, "It (the Delaware) is a purely native variety, and probably a seedling of the Catawba, or one of that group." "If I could have but one variety for my own use it certainly would be the Delaware, as it is the highest flavored native grape known." "All that it requires is a good rich soil, with fair culture, to produce the best results."

"Bunch and berries of a medium size, skin thin of a beautiful dark red color when ripe, flesh tender and juicy and scarcely any

pulp, exceedingly sweet, but still brisk and vinous, never cloying to the taste, vine very hardy, moderately vigorous and productive, ripens the first of September."

Mr. Huseman of Missouri, whose first favorite is the Concord, says, "The first season the Delaware attracted great attention by its fruitfulness, seemingly healthy habit, and excellent quality of its fruit; but the two following seasons it has been badly affected by leaf blight, and seems too feeble and delicate in its habit to become a paying fruit here compared with others."

The Concord, which is second in number of advocates, is a hardy, vigorous, and productive grape, though found to be more liable to rot and mildew than some of the other grapes. Its fine color, a rich deep purple, and largish berries make it a very attractive market fruit, for which it will be a favorite until purchasers shall learn to discriminate in buying between looks and flavor, as its juicy, pulpy, sometimes acid and foxy, though thin-skinned berry is decidedly inferior in table qualities to several other varieties; it ripens from 10th to 20th September. Mr. Huseman finds it the best grape in Missouri for table and market, and third for wine purposes.

Third, the Iona, which is also a seedling of the Catawba, which Mr. Fuller "considers the most promising of all the new varieties; the vine is strong, vigorous, short-jointed, and hardy; berries large, round, semi-transparent when they begin to ripen, growing opaque as the color deepens; skin thin, pale red, with deep small red veins at first, changing to dark red when fully ripe; flesh tender with very little pulp; sweet brisk flavor; ripens 10th to 20th September.

Fourth, Diana. This grape has been twenty-six years before the public, and has been always praised; but owing to its being more tender than some varieties, and more liable to rot and mildew, it does not rank as high as formerly; medium-sized branches; medium-sized, though often uneven berry, pale red with thick skin; flesh tender though more pulpy than the two former; keeps well after being gathered; ripens from 15th to 30th September.

Fifth, Allen's Hybrid is considered to be a cross between our native and the foreign grape. Bunches medium to large; berries round, good sized; skin thin, amber-colored; flesh tender, pulpless;

very fine vinous flavor; ripens 1st of September; rather tender, needing some covering to thrive in the Northern half of the Northern States, therefore not so good for the vineyard unless in well-protected situations.

Sixth, Crevelling. This is a Pennsylvania variety of grape which is very highly praised by those who have cultivated it, but has not been generally cultivated. Berries round, black, rather large; flesh juicy, sweet, and rich flavored; good bearer, vine hardy and vigorous; ripens from 5th to 20th September.

For the eastern half of the Northern States this list is undoubtedly all that one can wish who only proposes to plant half a dozen varieties; there are many others very popular and doubtless very valuable. First, the Adirondac, a seedling of the Isabella, which Mr. Brackett of Winchester, Mass., places second in his list of grapes. Bunches large; berries large; skin thin, nearly black, with a delicate bloom; flesh tender, little pulp, sweet flavored; ripens 1st to 20th September. Strong and vigorous grower. Second, Israella, seedling of Isabella, much like the Adirondac, ripens 1st to 10th September. Third, Rogers No. 15, which some cultivators think the best of the new seedlings; bunch rather large; berries loose, large, round, amber-colored, tender, juicy, pulpless, rich flavor, earlier than the Concord; vine vigorous and but little affected by mildew. This grape is constantly increasing in favor; but the great number, more than forty seedlings, grown by Rogers tends to create confusion, and some of the inferior varieties have been taken for No. 15, which has injured its reputation.

As we get farther West there is less unanimity of sentiment as to the six best grapes, because of the greater number of varieties which thrive in the different localities, and the smaller interest felt by cultivators in comparing and testing their individual experiences.

Mr. Huseman, of Missouri, recommended in an essay published by him in 1863, — for wine, Norton's Virginia, Herbement, Concord; for table and market, Concord, Herbement, Hartford Prolific, Blood's Black, Union Village, North-Carolina seedling, or Mary Ann.

I should consider any cultivator unwise who should stock a vine-

yard of whatever size with one or two varieties: he should have at least half a dozen, in order to take advantage of all circumstances; but where one can grow only a single vine on some fence, house-wall, or post, then let him select of the foregoing six varieties the one he prefers, sure that it will be as good as any grape yet discovered.

Leaving the varieties, we will now come to methods of cultivation. The first condition of success is thorough drainage; and whether the vine is to be in a city area or a country vineyard, no one can have reasonable hope of success who does not thoroughly secure good drainage.

Where otherwise there is no appearance of surplus moisture, a close, clayey subsoil almost prohibits success, as it is, like the copper bottom of a basin, almost impervious to moisture; and a sudden summer rain which does not appear on the surface may be collected in the subsoil like a pond, and give the vine, by its cold evaporations, a sudden check and mildew.

Second, Soil. Many specific soils have been recommended for grapes; in the grapery under glass, whether the border be within the house or outside, the soil and border must be rich, as the roots are compelled to draw their support from a limited surface. In garden or field culture, the best soil is a light rich loam, which must be thoroughly worked by trenching or subsoiling. If it is rich, it is an advantage to have a tendency to sand, and that a rich soil is rather stony is in its favor.

If the soil is poor, it must be enriched by well-rotted barnyard manure or special manures, of which the two best are ground bone, ashes and gypsum.

Third, Situation. First let it be sheltered, to reduce as far as may be the injurious sweep of cold winds. The garden or the vineyard, protected on the north, west, and east by high evergreen woods and hedges, is most likely to be healthy. When a side-hill well sheltered, and with the other conditions secured, can be obtained, it is the best, as the atmospheric conditions are more uniform, there is less tendency to stagnation of air, cold currents, and low temperature than on level land.

When a vineyard is to be made on a side-hill, select the side

facing east or south if possible, the west last, and north not at all, as it does not receive sufficient sun early and late in the day or in the year to give the vine its necessary stimulus.

If vines are to be grown in city areas, where the soil is on the shady side of the yard, procure a vine with a long cane, plant on the shady side, and lay the cane down under the bricks or flags of the yard, and bring it up on the sunny side; or plant your vine, and let grow the first season as long a cane as will ripen its wood; then stop it, and lay it down as before. You will also gain in this way more active root-surface, as the vine under the bricks or walk will root freely, and will obtain a much larger feeding ground: if the soil is rich and well drained, the roots will thrive under the pavement about as well as in the open ground; they will be protected from the direct evaporation, and, if they get less direct rain, will lose less by evaporation.

Fourth, How to plant. Prepare the ground thoroughly, not merely where you are to set the vine, but the entire surface to be used for the culture, by deep spading or trenching (see pp. 88, 89, C. L.), adding at that time such manure as you desire, carefully incorporating it with the soil. The soil ready, dig your holes eight feet apart, three feet in diameter, in rows six feet apart, deepest on the edges, say one foot on the circumference, shoaling to six inches in the centre, which enables one to spread the roots evenly, and give their ends a suitable downward tendency. When you plant in the open ground, set the stake in the centre of the hole first, lest it should injure the roots by being thrust in afterwards. Select good red cedar, locust, chestnut stakes, about three inches square or diameter; char the lower three and one-half feet; then drive them in three feet deep, leaving seven feet projecting above the surface; then set the vine, first softening the surface around the stake on the surface of the hole with a hand fork, as directed on pp. 157 to 160, "Country Life."

Select in preference two or three year old plants, and, before setting them, prune their roots carefully, and cut the cane back to four or six buds; after planting, leave the surface of the ground fine and smooth; if you plant in the fall, cover the ground with well-rotted top-dressing of manure, drawing the mulch or some

earth about the stem to protect buds; during the first season, the vines which grow feebly should be stimulated with liquid manure or guano, in order that all may be equally ready for pruning and training the second year.

If the vines are to be grown on espaliers, you may make the whole espalier when you set the vines, or only set the posts, leaving the completion of the espalier for the time when it is needed. Where the vines are to be trained on walls or fences, there will be no need of any long stakes. Light stakes one inch square may be set as a support for the vine for the first year or two.

When the buds break after planting, select the strongest, and rub off the other buds that all the strength may go into it, and, when it has made a few inches' growth, cut off the naked stem of the remaining old cane an inch or two above the new shoot: this shoot may be left to trail over the ground, or be tied up to the stake. About the first of August, pinch off the end of the cane to check its growth and ripen the wood. One or two new eyes may break below; if so, when they have grown a few joints, pinch them; the vine may now be left until time for pruning. The best season for pruning is from the fall of the leaf to the middle of winter.

It is best for all young vines to be lightly covered with some kind of litter during the first winter; and therefore convenience will induce one to prune before the cold sets in. Cut away the long cane, leaving two buds at any rate, and, to avoid accidents, it will be well to leave three or four. In the spring, before the vines have started, you can rub off the weaker buds. Save the canes you cut off to propagate new vines.

If your ground is not rich enough to maintain a permanent vineyard, top-dressing of manure may be dug in between the rows; best do this in the fall, and use well-rotted manure, as green manure, or too much of it, is likely to over-stimulate the growth when applied in the spring, driving the vine too much to wood, producing larger but not so well-flavored fruit.

We are now ready to start on the second year of the vine, and must commence by deciding in what way our vine is to be pruned. Experience has shown that vines left to themselves will grow

every year longer, and farther from the ground, with a long interval of naked stem of no possible good, at the top of which is the new growth and the fruit; and where the vine is left to run unpruned, the fruit will be large and fine at the top of the vine, and nearly worthless below. Pruning, therefore, is simply a process by which man brings the fruit-bearing portion near the ground, saving labor, and, as it proves, increasing the crop, by compelling the sap to feed all the fruit-bearing buds alike, producing fruit equally good in all portions of the vine. This is the principle; the application has varied with different cultivators, but the variations are easily reducible to two: the long-cane system, in which the vine throws up a cane this year which bears fruit next, and at the same time produces a second cane; next year the fruit-bearing cane of this year is cut out, and the succeeding or third year the cane of the second year bears fruit, and makes a new cane to replace the fruit-bearing cane of the same year. I will dispose of this method at once, by saying that although it has some advantages it is wasteful, more troublesome and inferior to the second system or spur-pruning. On pp. 116, 117, 118, you have the cuts of the method of spur-pruning applied to the grape-vine as it is carried along the rafters of the grapery: the principle is the same when enforced out-of-doors, though the management is different; but even though I may repeat myself I shall go through the treatment of the vine for the first four years.

Having decided upon spur-pruning, we must next decide whether the vines are to be grown on posts or espaliers, and we should remember that the wall of a house or a fence are the same as espaliers. It has been found best, in order to secure the greatest amount of fruit with the least expenditure of vital force, and to insure the even breaking of all the buds and a uniform supply of fruit, to bend the vine considerably out of the perpendicular, as thereby we retard the sap, and are enabled to produce uniformity in the length of the new wood, which insures an equal distribution of sap to all parts of the vine, and therefore a uniform development and quality of fruit.

When vines are to be grown upon espaliers, the first step is to produce for the second year canes which can be bent at a consid-

erable angle, if not a right angle, and carried along the espalier; the posts of the espalier being set eight feet apart, the vines may be set opposite them or half way between: in either case it will have eight feet in length by one-half the height to cover with fruit-bearing wood, and the simple problem is how this may be most perfectly done.

By referring to the plan annexed, you will see the method of pruning and training for several years; after the fourth year the method of pruning is the same, unless spurs become too old or chance to lose their buds, in which case they must be cut back to the arm. In time the arms themselves get too old to produce as vigorous fruit as when younger; in that event cut one out at the fork, when a new one can be developed from many latent or concealed buds which are always present at the base of buds formerly developed and removed, and which will grow whenever there is a chance; after one arm is renewed treat the other in the same manner.

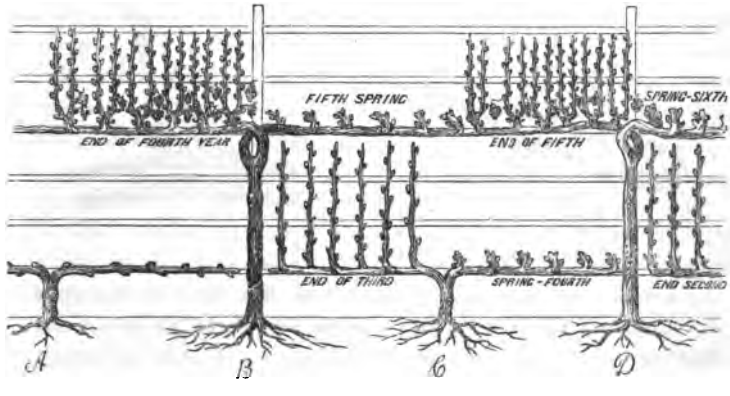


Fig. 1.

To return to our vine with four buds left at the commencement of the second year, let the two most vigorous buds grow, and rub off the others; as they grow, bend them down to the ground, or tie them to stakes, keeping them always very carefully bent.

Pinch the vines when they have made five feet growth; prune them back to four feet in the autumn, and lay them down and cover them up as the first year. At the commencement of the third year tie them to the espaliers at A and C; the buds will break at each eye; rub off all but those you wish to preserve, and tie them up to the espalier as they grow; when they have made three to four feet growth pinch them; they will then be in the condition shown by the left side of C. Prune them to two buds; besides these two buds, B and C, shown in fig. 3, there will be several base buds, D, E, F; leave them all until spring.

In pruning the vine this and succeeding years be careful to cut the right hand-spurs so that they will incline to grow to the left, and the left *vice versa*, to ensure the espaliers shall be covered evenly, — this is best effected by leaving that bud as terminal for growth which has the right inclination.

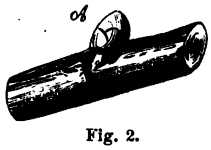


Fig. 2.

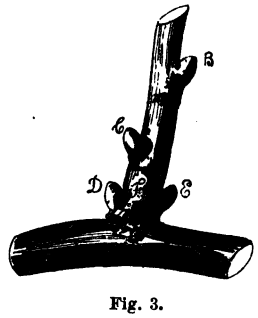


Fig. 3.

Plate No. 2 shows the condition of the buds on the arms at the end of the second year. Plate No. 3 at the end of the third year.

The fourth year there will be two shoots, one starting from B or E, plate No. 13, for fruit; and one for growth of new cane from C, D, or F, according to which of these buds is the strongest and has the best inclination; all other buds but the two will be rubbed off. B, in plate No. 1, shows on its left side the condition of the vine at the end of the fourth year, and on its right, when pruned at the commencement of the fifth.

Fig. 4.

Plate No. 4 shows the condition of the spurs at the end of the fourth year, the right hand cane B developed from bud E, in fig. 3, and produced fruit; and cane D was developed from bud D in same plate, which was the strongest of the base buds; after the cane B had grown two buds beyond the fruit, it was pinched, and D was pinched at three feet; in the autumn, all the fruit-bearing spurs were cut off at H, in fig. 4, and the other shortened back to two buds of base.

Remember that the object of this method is to keep the spurs short as possible, by constantly bringing up the new canes from as near the arm as the buds will permit. When the vine is pruned in the autumn, it is safe to leave one more bud than we mean to retain to enable us to cut it off later in the year, when the frost of winter may have chilled the upper bud; as I have said in another part of this book, the pruning should always be made midway of an internode to leave a bit of cane above the bud as its protector.

Plate No. 1, at D, shows the vine at the end of the fifth, and pruned for the commencement of the sixth year: there is a difference between A and B, C and D, in that B and D are trained on the upper half of the trellis; to get the vine up the extra height, generally requires another year. When at the beginning of the second year the two buds grow into two shoots, and are bent down, in order to produce B and D, we remove one shoot and carry it up to the place where it is wanted, stop it a little beyond, and, when ripened, prune the wood back to the point at which you wish to have it commence growing the third year, rubbing off all the buds below; from that time the treatment is the same as A and C.

This method enables one to carry a vine on the side of a house or as high as he desires, and spread it where he wants it, either

to get it into the sun or out of the way of thieves: this method of pruning once fairly understood, the cultivator can do what he pleases, carry his vine where he pleases; if he wants to lay a tender vine down and cover it each year, he can carry one cane the second year diagonal to the espalier, and the third year carry out his spur from one arm instead of two; then, when the fall comes, he can untie the vine and cover it as he thinks best. When vines are grown on walls or houses singly, they may be allowed to make longer arms and spurs than when in vineyards, as the vine has more room for its roots to feed.

Fig. 5.

Plate number five shows a spur which has grown too old and clumsy to give vigorous canes and the best of fruit: remove it at the line *A*, *B*, but not smooth with the wood, as the latent buds are more readily developed from the base of the spur, a little above the arm, than from the surface of the arm itself.

Espaliers for the support of the vine are but rarely used in the vineyard, where it is usual to tie the vines to stakes. The vines are allowed to grow about six feet high, and are then stopped, and pruned according to the short-spur system. This is cheaper, and very often a more convenient method; but, unless the vine is twisted, in order to retard the flow of sap, the upper buds will be over stimulated, and produce the best fruit. There are many ways for doing this, but by far the best is that practised by Mr. E. A. Brackett, of Winchester, who, taking the two eyes and canes of the second year, winds them in opposite directions in a spiral around his stake, keeping the two canes about four inches apart, and stops the growth by pinching when the vine has reached the top of the stake. The spiral vine is in much the same condition as the horizontal, and is pruned by the short spur method. A secondary advantage of this method is, that as the vines acquire age, they become rigid, and ultimately can dispense with a stake.

How long vines can continue to be pruned in this manner and yield profitable crops has never been ascertained. But there are some in Europe more than one hundred years old, still bearing vigorously every year. As vines acquire age and stretch their roots indefinitely, they could be allowed to carry out their arms much farther, and in such cases the alternate vines should be removed to give room on the espaliers to the remainder. As the cost of vines in the new vineyard is large, the proprietor should, as far as possible, propagate his own vines; and I should not do justice to this subject, were I to leave it without briefly setting before the reader the best methods for their propagation.

If our object is to get new varieties, plant the seed selected from well-grown and perfectly ripe grapes of the variety to be cultivated. The seed must be kept from drying, or their vitality will be injured, which may be prevented by drying the grape into a raisin, which will keep the seeds moist until spring, or by planting them in the fall, in open seed-beds, or boxes of loam, or sand, which are to remain under cover: as grape seeds very often do not germinate until they have been in the ground two years, the cultivator must leave the bed in which he plants them undisturbed for two years, unless as many vines come up the first year as he wishes. The seed should be sowed in drills one foot apart, seed three inches apart, and half an inch deep: plant in a light, rich, loamy soil; when the seedlings come up, shade the young foliage in its infancy from the scorching rays of the sun; the plants will soon grow strong enough to need no protection; they may be allowed to grow together in a mass until fall. When they have made a few leaves, tie the little plants up to small sticks, and pinch them after they have made six or eight good buds; in the fall take them up, cut back the wood to four eyes, leave the tap-root of a moderate length, and either plant them at once in rows four feet apart, plants four feet apart in the row, or cover them up, tops and all, in a trench until spring; if they are planted out, they should be covered with a protection of light litter until spring. In the spring tie them up, and let them run from four to six feet, then stop them, and cut them back in the autumn to four eyes, when they will be ready to be set out in a permanent position. The fruit continues

to improve for several years, so that it is not possible, until the vine is mature, to decide upon the success of the experiment.

But if you want to increase the number of plants of the kinds you now have, it must be done by cuttings, either of a single eye or of several eyes, or by layers. In layering the vine, you do not need to tongue it as is directed on p. 289. When it is laid down under the soil, it will root at every bud, and if the buds are near the surface, each eye will break and throw up a cane; when well rooted, cut the layer off the main stem, and treat like a new vine.

Single eyes will give the greatest number of plants in the shortest time. Cut buds off with a piece of the internode on each side as in plate 12, taking them from wood of the last year's growth: you may set the bud in that condition in the soil, covering the bud about a quarter of an inch; or you may slice off the lower part of the wood under the eye, nearly or quite to the pith; or you may cut the bud away from the internode at the upper end, and taper the lower end, leaving it an inch or two long. In the first two cases the bud is laid horizontally on the earth, in the top of the pot, and then covered over; in the other the pointed end is pressed down into the earth in an oblique direction, until the bud is covered as deeply as before. On p. 292 of "Country Life," you will find its after-treatment indicated. It is quite necessary in order to succeed with single eye cuttings to have bottom heat until the plants have got well established, when they may be potted off into small pots, or be at once set in an open frame or bed in the ground, to be treated like seedlings. You can get bottom heat by the hotbed where there is no greenhouse.

Cuttings of two or more eyes may be set at first in the open ground: when the vines are pruned in the fall, cut the prunings into two, four, or six buds, according to the number of plants you need; two will answer. Pack them in sand or loam, and keep them during the winter where they will be moist, or bury them in the garden; prepare the cuttings by removing the wood smoothly at the base of the lower bud, and two inches above the top of the upper bud. In the spring make a trench of good soil, with a sloping side deep enough to take the cuttings; set them in four to six inches apart, and cover all but the top eye with soil; return all the

earth back, and press it compactly about the cuttings. If the weather should be very dry, occasionally watering to keep the ground moist might be necessary; they will very soon commence growing, and frequently make three to six feet the first year. Tie them to stakes as they grow, and pinch the ends of the vine as in other cases; in the autumn take them up, prune back to four buds; you will find roots have started out from each bud which was below the ground; cut off the root-stem below the strongest roots, and then cover the vines till spring, or set them in their proper places.

Another method of increasing vines is to graft old or worthless stocks with new varieties; the method in "Country Life," on p. 562, is not the best; it has been proved that grafting the root or lower part of the stem by the cleft method is more successful, cutting the vine off just below the surface of the ground, or as near it as is convenient, using but one scion of one year's wood, shaping it as you would an apple-scion: insert it so as to bring the edge of the inner back of the scion and root together; cover the head with grafting clay, or merely return the earth close about it. Mr. Fuller recommends, when this is done in the autumn, setting an inverted pot over the top of the scion to protect it when we remove the covering in the spring, and then to cover the whole with earth and litter.

Cuttings may be made of the immature wood, but they are more troublesome, and some think can never make healthy vines, though there is no reason why they should not, after they once become established; the cutting is made and treated as is described on p. 284 to 286; cut a piece of the vine with two eyes upon it; cut away the cane smoothly below the lower eye, and a short distance above the upper, leaving the leaf that is opposite the upper eye; the cane should be taken off smoothly below in order to offer as large and smooth a surface of the cambium layer as possible, out of which the new roots will be emitted; set these cuttings in pots like that shown on p. 284, and treat as is there described; when they are well rooted, transplant to open beds, frame, or small pots, and treat them as heretofore described.

With these directions I must leave the subject, believing that I

have simply and succinctly stated the leading facts, and given the important directions about the vine which will enable any earnest person to cultivate grapes successfully. There will be, of course, many questionings occurring to every one which I have not answered; many cases to which my directions do not seem to apply; but I have given the principles, which, like the foot rule, may be applied by intelligence to all cases.

Different localities will require different treatments, and will be exposed to very dissimilar obstacles; men who live near great sheets of water, as on the islands in Lake Erie, will be able to grow grapes with a perfection unknown to the main land, the great body of water producing a more equable condition of atmosphere. The vineyard on a side-hill or upland will escape some of the trials which annoy those in valleys; but each grape-grower will learn how best to contend with his own enemies, and at length sufficient knowledge will be gained to enable us to overcome the principal obstacles to grape-culture. Before many years, we may reasonably hope to see grapes adapted to every locality, which will funish an abundance of fruit and wine.

CHAPTER VI.

THE FARM.

DURING the past six years, there have been many improvements in farming tools and stock; by the aid of improved tools, the old men, women, and children of the Northern United States have cultivated and harvested full crops, with as much ease as the entire male population before the war, and with greater profit.

I shall not recount the changes in tools, for they are still progressing, and the tools which are seemingly perfect this year may be surpassed next: in "Country Life," I described and gave an illustration of a very excellent mowing and reaping machine, which is antiquated now; and the same would be true in a few years of the best mower or reaper of the present day. Great as the advances have been, there is an immense field still open in the application of steam-power to cultivation: many steam-ploughs, field and road engines, have been invented, but none which can do the work with sufficient economy. The time is near when all the work of the farm will be done by steam: the farmer will make a fire under his engine, get up steam, ride to his field, plough, harrow, hoe his crop, cut and harvest his hay and grain, gather it into wagons, and move it away by steam; nor would such power reduce the value of cattle and horses, or the rates of labor. Nothing in human economy is more remarkable than that every simplification of process, every invention of labor-saving machinery, has increased the demand for labor, and the rate of wages. The Spanish Proverb says, "It takes a mine to work a mine;" and it certainly takes a machine to repair and utilize each new machine, and men to supervize, control, and use them.

The improvement in stock-breeding has been in sheep, rather than cattle. The greatly increased demand for wool for the past six years has made sheep more valuable than formerly, and of

course as fast as sheep become important, men try to develop them into their most valuable form and condition.

Wise sheep-breeders have been at work for twenty years, laying the foundation of the new and improved varieties of sheep, and were ready to meet the inquiry for them, when they were wanted; and, stimulated anew by the rapid and profitable sales they made of their improved animals, they have continued breeding with care until we now have an American merino sheep, which is better than any other variety of sheep for wool, and although carefully bred from Spanish imported stock, have so far outstripped their progenitors that our sheep are carried from America back to Europe to give the flocks there fresh start and better blood.

What variety of sheep is best for this whole country cannot be settled in a word. There are many considerations latterly overlooked by sheep-breeders, which will yet qualify the estimation in which the merino is held, and which will raise other varieties, if not to its level, to at least a very high point in the general estimation.

Sheep are valuable for mutton and wool; and the greatest profit seems certainly to lie in a sheep which will make the best and most mutton, and the best and most wool, at the same time. With the usual enthusiasm of Americans, who believe that what is good for one part of the country must be for the whole, some breeders have assumed, that, with sufficient care and time, such a sheep may be produced.

But there are certain indisputable facts which contradict this theory: all sheep do not produce the same kind of wool; there is as much difference between the wool of a merino and Leicester or Cotswold as between the feathers of a turkey and eider-down. The merino wool, whether long or short, is very fine, and each separate fibre is crimped or curled; whilst the wool of the Cotswold is coarse and straight, with few, if any, curls and crimps. These distinct characters never vary, and are of great importance, as from the fine wool broad-cloths and fine cloths are made; whilst blankets, shirts, alpacas, and similar goods, are made from the coarse; and neither kind of wool can be made into both kinds of cloth.

This fact leads to another. In England there are several breeds of sheep, which have been in that island so long that they are called native. These sheep are all long-wooled, though some, like the South-downs, are shorter and finer wooled than the others; and, though bred for years side by side, the fine and coarse-wooled sheep have maintained their differences. They have also differed in size, the coarse-wooled being the largest. Many breeders have tried to combine these two kinds, and various cross breeds have been made, some lasting for a time; but all the valuable improvements have been made in the direct line of the same variety as coarse or fine wool, or rather, as they call it, long and short wool. Besides the difference in the wool, there is a marked difference in the quality of the mutton; the short-wooled or South-down sheep having always had the highest reputation for the quality of their mutton. Certain English breeders have improved the quality of the coarse or long-wooled sheep. They have increased the tendency to fatten, reducing the coarseness of structure, replacing bones by fat, and substituting a rounded outline, and skeleton capable of taking on flesh, for the gaunt, leggy, bony animals which yielded but little mutton or wool.

The old Leicesters are described as large, heavy, coarse-grained animals, the meat having little flavor, and no delicacy; the carcass was long, thin, flat-sided, with large bones and thick legs; the fleece was heavy, long, and of coarse quality. The sheep were slow feeders; and when sent to market, at two and three years old, weighed about one hundred to one hundred and twenty pounds each. Mr. Bakewell by care produced from these sheep the new Leicester, a sheep without horns, with white faces and legs, head small and clean, eye bright, neck and shoulder square and deep, back straight, deep carcass, hind quarters tapering towards the tail, and somewhat deficient in this respect when compared with the Cotswold sheep; legs clean, with fine bone; the flesh is juicy, but of moderate quality, and is remarkable for the proportion of outside fat it carries. They are not considered so hardy as the other large breeds, and require shelter and good keep. Early maturity and an aptitude for fattening

are the principal characteristics of the breed; wethers at twelve to fifteen months old weighing from eighty to one hundred pounds, and at two years they average one hundred and twenty to one hundred and fifty pounds each; fleeces averaging seven pounds each. I have quoted the Leicesters, not because I should propose them to our farmers as the sheep for us, but to show what has been done.

The merino sheep, with all its wool, and all its good qualities, is inferior in flavor and quality of mutton to the best coarse-wooled sheep; and no amount of breeding has ever changed it materially in this particular: it is just as inferior to the improved English long-wools as they are to the short-wools. Were fine the only or the best wool for manufacturing purposes, it might be best to content ourselves with poor mutton, and make up in the wool. But this is not the case; the long-wools are equally important, and some of them, for special purposes, sell higher than the fine wool. The obvious conclusion is, that long wool and good mutton are to be set against fine wool and poor mutton. Nor is the weight of fleece of clean wool in favor of the merino in all cases. Owing to the large amount of yolk in the merino wool, their fleeces average much heavier than the long-wooled sheep; but from fifty to seventy per cent of the weight will scour out when it is cleansed against thirty to forty per cent of the weight of the long wool; and therefore, in many cases, carefully bred long-wooled flocks will beat fine wools in weight.

Generally, however, the flocks of full blood or grade merinos yield a greater average weight of wool than any other sheep. Therefore where sheep are raised for wool, as they must be where distant from market, the merino is preferable; but where the market is convenient, the long-wooled and fine-muttoned sheep may be made more valuable to the breeders. I do not mean what are now called mutton-sheep in New England and Canada, any more than when I say merino I mean the merino sheep of 1850, whose average fleeces would weigh three pounds against five pounds to-day, but the mutton sheep which will be bred by some competent person who will improve it, as Hammond and others have improved the merino.

The merino has certain qualities for New England, and much of the Northern United States, which are invaluable: they are good workers, not being willing to feed in the same pasture, however fertile, unless it has considerable range; they will walk over the surface, cropping the bits they like, until they get back to the hills and sterile places, seeming to find in the stunted herbage food exactly adapted to them; and, as we know, they improve the poor land by feeding upon it. They thrive on lands that would be only a burying-ground for the improved Leicester or Cotswold. The merino also are very quiet; and though inclined to ramble for their food, they are not unruly, and are restrained from jumping by very moderate fences, whilst the old-fashioned mutton sheep could be controlled only by six or seven high bars. Careful breeding has changed these sheep in shape, wool, and mutton; has reduced the wild flocks of former times to the quiet and contented animals which follow their master whenever he appears.

The number of sheep in Vermont, the headquarters of the merino, has not increased in the last ten years in proportion to their quality; but the yield of wool to the head has doubled. The credit for this change is due to a few men who, though, at first prejudiced against the Spanish merino, soon saw their good qualities, and purchased full-blooded animals from the importers, and have carefully bred them since; never mixing any impure blood with their flocks. The Vermont merinos originated from two families of Spanish sheep, called, in Spain, Paular and Infantado; names belonging for many generations to large families of sheep which were carefully bred, and kept from any intermixture with other families. These sheep were driven every year from one part of Spain to another, seeking pasture; making a march of eight hundred miles a year, for so many generations, that the sheep became great travellers, and, according to the Darwinian theory of development, acquired a constitutional capacity for enduring labor, and a disposition to work for their living, of great value to us. Imported into America at different times, most of the merinos were mixed with the common sheep; but some of the Infantado family passed into the hands of a Mr. Atwood, in

Connecticut, who kept them pure, and from whose sheep the improved Infantado or Atwood merino is derived.

The Paulars were brought to the United States by Mr. Jarvis at about the same time with the Infantados. Some were kept pure; others mixed and disappeared amongst other sheep. A few full-blooded Paulars went into Vermont, and are still bred there, but have failed to find as many admirers as the Infantado or Atwood sheep, which, as improved by Mr. Hammond, of Middlebury, who has done for the merino what Mr. Bakewell did for the Leicesters, are certainly the beau-ideal of fine-wooled sheep.

I cannot give the details of their breeding, or enter into minute descriptions of these sheep. They have been described in the Patent-Office Reports, in Randall's "Practical Shepherd," and elsewhere; and it is enough for my present purpose to say, that, as merinos, they stand first, and have been sold for fabulous prices. Mr. W. R. Sanford, of Orwell, sold twenty-three two-year-old ewes, in 1863, for $15,000, and they were soon sold a second time for an advance. Mr. N. T. Sprague, of Brandon, Vt., a celebrated breeder of these sheep, has a buck which he values at $20,000. Bucks have been sold within the past two years for $5,000 to $7,000 each; and offers of $10,000 have been refused; and ewes for $1,000 to $8,000. These prices seem fabulous and purely speculative; but it is not speculation alone, rather the real merit of the animal, which sells them. One of these extra bucks taken West, and crossed on any flock of coarse-wooled sheep, would, in two or three years, double and perhaps treble the yield of wool, without increasing the cost of producing it, and at the same time perhaps give rise to a lamb as good or better than himself.

Nor is the improvement imaginary: it is conceded by those who have grown sheep, and who for years kept only the common varieties, that the present merino is better than the old sheep in all particulars. Their wool is finer, more uniform in all parts of the body, equal in quality, is stronger, makes stronger and more durable cloth; the sheep are less liable to disease, are better shaped, more compact; every part of the body is covered

with wool, the head and face, all but the top of the nose, and the legs down to the dew-claws, just above the hoof. More wool can be cut from the parts of these sheep which used to be naked, than came from the whole body of the old common sheep.

The wool is worth from ten to twenty per cent more in quality, besides its increased quantity; the average of most flocks now being from five to seven pounds per head, and many going as high as twelve pounds per head. Mr. Sprague cut from ten yearling ewes, eight of whom had born lambs, which always reduces the wool, one hundred and seventy-two pounds, thirteen ounces, — one shearing nineteen and three-fourths pounds, unwashed wool.

Mr. Darwin E. Griswold, of Orwell, who has been several years breeding these sheep, estimates the improvement in the average yield of Vermont wool to be two and a half pounds per head. The coarse sheep have been improved by Spanish merino blood, making their wool finer and heavier; whilst the Saxony sheep, a smaller variety, which yield very fine wool, have gained in size of body and fleece, losing some of the fineness of the fibre by the same cross.

This improvement has resulted from the constant care of the breeders, who have never sold their best sheep, but preserving the best to make their flocks better, and selling only the poorer sheep; and we may reasonably believe, that, if they adhere to this practice, these sheep will be still further improved, until the culls of the flock will be as good as the best are now.

To bring the merino to their present condition, it has been necessary to keep them from storms in cold weather, and feed and water them generously. Formerly, sheep were left to shift for themselves all winter, the farmer tossing some hay or straw to them every day, or letting them eat at a stack, without shelter or care. I have seen large flocks, which have remained out through sleety storms in winter, perfectly cased with ice.

The barns provided for their flocks by good sheep-farmers of the present day are models of convenience and comfort; the sheep are sheltered from all severe storms between the first of October and May. In the winter they are fed with the best hay, have free access to pure water, and are kept warm in good cel-

lars or barns; their lambs now come in March, when they can be easily watched and provided for by the shepherd, instead of being scattered far and wide in bleak pastures, to be hunted up, or left to die if exposed to a severe storm. The sheep are sheared in May, and sheltered from bad weather until their new wool grows enough to protect them, and then turned into well-fenced pastures, which are not overstocked. During the summer they are carefully watched, salted, their noses kept tarred, to drive away the fly, and then, as autumn's storms come on, are carefully protected.

It hardly seems as if all this increased cost could pay; but it does. Mr. Daniel B. Buell, a careful breeder in Orwell, Addison County, Vermont, who has been brought up with sheep, and has kept them in all ways, considers that the present price of wool, fifty to fifty-five cents currency, pays for all the extra trouble. He considers that the better the sheep are fed, the more profitable they become. He turns his sheep into his best fall feed, to bring them into the barn in good condition, and then keeps them well during the winter, giving a peck of oats and corn to fifty sheep per day, with abundance of best hay, and pure running water. Too much care cannot be taken to provide water in abundance. Sheep do not drink much, but often. They do not need grain all winter: it is best to give it them at first, when changing from grass to hay; and when they become used to hay, and are thriving on it, the grain may he withdrawn, until towards spring.

The breeding ewes should have grain, oats and shorts being best, six weeks before lambing, and turnips or some roots, in order to increase their milk. A variety of food is of great importance to them; many careful experiments have been tried, in England and America, with different varieties and mixtures of food; and the result has been always in favor of mixed food in which there was a large proportion of roots.

Strangers to the merino are frequently surprised at their wrinkled appearance, and do not understand how the many folds of skin sheep-fanciers desire to produce, can be of any value. The original merino was a nearly smooth-skinned sheep, with a

tendency to folds of loose skin about his neck; these folds were, of course, extra skin, and caused just so much more wool-surface. As the sheep were improved, the tendency to wrinkle increased, and it was soon considered a proof of improved blood; this induced some breeders to try to increase the wrinkles on their stock, until sheep are produced that have twice as much skin as their carcase would warrant. Wrinkles are by no means a proof of good blood, nor are they especially desirable; the wool of very wrinkly sheep is generally shorter and less valuable, though it is equally true that some of the best sheep are very much wrinkled. Wrinkles belong to no one famlly; and Mr. Sprague, who has kept them sixteen years, thinks they are rather a proof of mongrels, or mixed families of merino.

The merinos are less subject to disease than common kinds of sheep, which seems contrary to analogy; as we should expect that increased care and protection would make them more tender. Sore lips, sore eyes, a kind of colic called stretches, and foot-rot, are the principal diseases. Grub in the head is very troublesome sometimes, but may generally be prevented by tarring the nose in the summer, to drive away the fly which seeks to lay its eggs in the sheep's nose. If the eggs are laid, the grub, after it is hatched, creeps up the nostril, and attaches itself to the upper part of the mucous membrane, causing the sheep great uneasiness, and sometimes, when their numbers are excessive, death.

Sore mouth and lips generally come from eating some pernicious weed in the grass or hay; lambs are frequently very much distressed by sore lips after the winter sets in, when hay is their principal food. Whether due to hay or other causes, this sore mouth generally yields to a few applications of healing ointment of any kind, even common mutton-tallow. Sore eyes, ophthalmia, and the like, will generally pass away without any permanent injury, after bathing the eyes a few times with luke-warm water. Some shepherds recommend many kinds of violent treatment, but they are useless, and often injurious; Nature will effect a eure with the most simple treatment.

Foot-rot, the scourge of thousands of flocks in Europe, is well

known in America, but has not yet become a great evil here. It is an inflammation of the foot, which first shows itself in the skin between the cleft of the toes at the top of the hoof; this skin is commonly as fine, "sound, smooth, and dry as the skin between a man's fingers; the first symptom of hoof-rot, is a disappearance of this smooth, dry, colorless condition of the naked skin at the top of the cleft over the heels, and of its coolness;" the skin becomes chafed, a little corrugated and moist, and, as the disease increases, hot. The part first attacked becomes sore, discharges a very foul-smelling water, and soon ulcerates; the ulcer extends between the horn on the inside of the cleft and the inner sole or core of the foot, and increases very rapidly; if not cured soon, the inside of the foot will become entirely rotten, and at last the hoof drop off.

As soon as a sheep is seen to be lame, it should be caught, and examined; if there is any appearance of rot, dissolve some green-vitriol in hot-water, making a strong solution; then lay the sheep on its back, holding it partly between your knees; pare the inner-sole, or side-horn, as thin as you can, and not bring blood; cut the diseased horn entirely away if possible. Return the sheep to its feet, but set the diseased feet into the hot solution of vitriol, taking care that it shall not be scalding hot; let the sheep stand on its feet, resting its weight as much as possible on the feet in the solution; so that the pressure may open out the hoof, giving the vitriol a chance to get into every part. Let the sheep stand three to five minutes, and then take it out, and turn it into a dry place, where it should be kept for a day out of the wet. Very bad cases will be cured by one immersion, if it is thoroughly done; many specifics are advertised to cure foot-rot, but none will be found more simple or effective than this.

Foot-rot is attributed to many causes; changing from a light and dry to a low and wet pasture; too much rank, green food in the autumn, producing general derangement and inflammation of the system; contagion, filthy yards, wet straw. Whatever its origin, it should be watched with care; a lame sheep should be examined as soon as seen, and isolated from the rest of the flock,

as it is certainly contagious; and common sense should teach every one to keep their sheep in clean and dry quarters. It has so often appeared in flocks which have been removed from high and dry summer-pastures to low and damp meadows in the fall, that I suppose we must believe it is often originated in that way; but it appears in flocks not subjected to such changes, whilst flocks in wet meadows often entirely escape. I believe, that, although often due to locality, it is also hereditary, like the gout; and that descendants of flocks in which the hoof-rot has been will always be subject to it.

Where a flock of sheep, or an individual, shows the hoof-rot, it is very desirable to change their food, and clean their yards and stables at once, as so violent a disease cannot fail to affect the general system, and no local treatment will dispense with a proper attention to food and cleanliness. No good sheep-farmer will ever allow his yards and folds to get filthy, but will clean them as carefully as the horse-stable, and permit no accumulation of manure or litter.

CHAPTER VII.

FARM.

In order to present to those of my readers who are not farmers or stock-raisers a clear idea of the management of sheep, I will follow a flock through a year, and will commence with them in January, when they will have become accustomed to winter food and treatment.

The amount of food, whether hay or grain, which sheep or other animals require to keep them thriving, depends on the condition in which they were when they were brought into the barn, and the kind of building in which they are kept. It has been found, that, when sheep commence the winter fat, they can be kept so with very little extra care; first-rate hay and plenty of fresh water is enough for most of the winter. But, if they come in poor, it is very difficult with any amount of feeding to get them fat, or keep them improving. To insure the best condition, some farmers give their sheep a little grain every day, after the frosts set in in the fall, to replace the sweetness of the herbage, as it withers under the frost, — a gill of oats per day per head would be ample for this purpose.

A perfectly warm barn may be made above the surface of the ground; but the best way to secure warmth is to dig a cellar in a side-hill which faces to the south or east, selecting a place to which water from a spring may be readily brought through pipes. Build a solid wall on the west and north, and board up the east and south, leaving large windows, which must be carefully glazed, as sunlight is of great importance to the health of the sheep. Carry a drain under the walls and across the floor of the cellar to keep it perfectly dry. Over the cellar erect a suitable barn to hold hay and grain, but not for stabling cattle, as their water would leak through, and injure the wool. The room may be

divided into as many small apartments as is desirable by using racks for holding the hay, as division fences, taking care to set them in such a manner that the hay sent down through a tunnel from above can be easily distributed to each rack without extra labor, and without carrying it over the sheep, sprinkling hay and seed on their wool, which is very injurious, dirtying the wool, and causing irritation in the skin, which induces the sheep to tear out their wool with their teeth, or by rubbing against projecting surfaces in their efforts to allay the itching. Set the water-tubs convenient to each apartment, so that all may drink at will; if the racks are properly made, hay and grain can be fed in the same rack with economy. Shut off a small space, which should be built up for bucks, like a room. When they are allowed to run with the sheep, their long horns catch in the wool; and as they are often cross, they bunt the other sheep, perhaps killing a pregnant ewe, or destroying her lamb. In such a cellar as this, the sheep will be warm all winter, and ewes can be permitted to lamb in March with greater security than out of doors in May, as the young lambs are protected from the damp ground and cold currents of air. One hundred per cent in lambs may be reasonably expected, whereas the merino left to lamb in the fields rarely give over eighty per cent.

The cellar should be connected with extensive yards on the south and east, to which the sheep should be admitted whenever the weather will permit, in order that they may get as much exercise as possible. Want of exercise is very injurious to breeding-ewes in particular, some flocks having been nearly ruined by confinement.

By January, the sheep will have become accustomed to their winter-food; and if they are in good condition, and the hay is of the best quality, their grain may be slowly reduced until none is given. Keep salt with a little sulphur in some accessible place: the sheep like it, and its free use is thought by many to counteract the tendency to stretches. The feeding should be perfectly regular in time and amount; in winter, feeding three times in the day, and once in the evening, would be none too much; and, every day, all the remaining hay, straw, and stubble

should be cleaned out of the mangers, and given to colts or horses.

Early in February, the sheep should be sorted; all the lambs, wethers, barren ewes, being removed from the breeding-ewes.

If the ewes were properly marked when tupped, it will be easy to know when to expect them to lamb, as they are regular, rarely exceeding one hundred and fifty-two days.

Strong ewes rarely need any assistance in labor, but the lambs often come weak, and, if they are born on a cold night, might die before morning. To prevent mishaps, good shepherds visit the flock once, and better twice, between the last feeding and morning. The new-born lamb will soon get sufficient strength to stand up, and will immediately try to suck: if he once gets his stomach full of his mother's milk, he will take care of himself; but if he seems to be unable to find the teat, or the mother will not stand still, the shepherd turns the ewe's head into a corner, stands over her, holding her tight between his legs, his face towards her tail. he moves the lamb up to the mother's udder, and inserts the teat into its mouth; if it does not incline to suck, by inserting his finger a little way into its mouth, and tickling the tongue, or roof of the mouth, it will be induced to try. If it really makes a vigorous pull, it will soon learn to take care of itself; milking a few drops into its mouth will sometimes stimulate an unwilling lamb; but it often happens that all is useless, and it will not suck: for this case, the bottle is the only remedy. A common pint-bottle with an India-rubber nipple is the best for convenience. The milk of a new milch cow warmed to the temperature of the body, sweetened with molasses or brown sugar, and stiffened with a few drops of whiskey, should be ready; and rather than tire lamb, mother, and shepherd by ineffectual attempts to make it suck, give it a good feed. It will soon gain strength, and compel its mother to stand for it. In very cold nights, lambs should be wrapped in a piece of old carpet, buffalo, or be well covered with straw: they are easily chilled, and yet may often be saved by timely care. I have known a very valuable sheep grow up from a lamb, which was so far gone with cold and hunger, that he was wrapped up, placed

in a warm oven, and fed with whiskey and milk from a spoon for several hours, giving a few drops at a time, until it could run round, and bleat as loud as the best lamb in the pen. As soon as the lamb is able to run about, all solicitude is over, for they will gain very rapidly.

Within a fortnight of their birth the lambs' tails should be cut off about two joints or vertebræ from the body. This is done by laying the tail on a block of wood; press the skin back as much as possible, so that when the bone is cut the end of the skin will project beyond it; after cutting the tail, the two flaps of the skin may be drawn together with needle and thread to check bleeding. The tail should be cut with a quick blow, of a dull chisel; if bleeding is profuse, the end of the tail may be seared with a hot iron, which effectually stops bleeding and saves the lamb's strength, which often suffers from the loss of blood, but when the operation is made just right, there will be very little bleeding, which can be neglected. The older the lamb is, the more he will bleed and suffer from it. The male lambs not to be preserved for bucks should be castrated within a few days of the docking, so that the lamb need have nothing farther to impede its growth.

Running with their mothers, the lambs will early learn to eat some hay, grain, &c., and will thrive if the mothers have sufficient milk. Some over-zealous breeders feed their choice lambs with cow's milk for some weeks, by which they increase the size of the lamb.

After the lambs are all born, there will be but little for the shepherd to do until shearing, other than the regular routine of feeding and tending. In old times shearing was postponed until June; now the sheep are sheared early in May, before they are turned out to pasture, which saves the trouble of tagging. If the sheep are to be turned into the pasture before shearing they must be tagged; that is, the wool on both hind legs, from the roots of the tail down, should be cut off. The change of food from dry to green will cause the sheep to scour, and if the long wool is on the legs it gets very much injured in value; the tags are laid aside in the wool-room until shearing, when the clean

wool is rolled in with the fleece, the remainder put with the sweepings of the wool-room floor, to be sold as dirty wool.

When the sheep are not sheared until June, they suffer from the heat through May, and sometimes shed their wool; and, after shearing, the hot summer sun blisters the skin, and often checks the growth of the wool for the year. When sheared early in May, they must be sheltered at night and during cold storms; in a fortnight, enough new wool will have grown to defend them against any ordinary weather.

Whether sheep should be washed before shearing is a mooted point: we know that a large percentage of the weight of wool is dirt and grease for which the buyer does not want to pay; if this could be thoroughly washed out the remainder should command a high and corresponding price. But to wash completely, the sheep should be soaked in warm water with potash in it, and then be carefully scrubbed until every vestige of dirt is removed. The usual practice, merely dipping the sheep in cold water, or letting a stream run over them, an attendant squeezing the water out as fast as possible, can remove but little dirt. Buyers careless or ignorant pay alike for all kinds of washing, and of course discriminate against the good work. If wool is not washed, the buyer takes off a third of the weight from all wool alike, which is also indiscriminating and unjust.

A sheep kept well in clean stables, with no exposure to hayseed, mud, or filth, will get but little dirt into its wool, and whilst some sheep are full of coarse heavy yolk, properly called grease, others having only a light, soft oil, of course the wool of the latter has less waste than the former; but if all unwashed fleeces are shrunk alike, the heavy wool is most profitable to the farmer. Sheep sheared early should never be washed, as they are liable to take bad colds from carrying a heavy wet fleece until it drys; besides the rough handling which they must undergo is bad for them.

Every physiological argument is against the practice, and nothing in its favor but the cost of the dirt to the buyer. When the time comes that men who buy are really good judges of wool they will pay for wool according to its quality, which

will encourage farmers to take pains to produce a really good article.

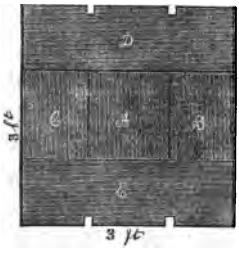
The clean floor of any room or barn is selected for the shearing-place, and when there is no suitably clean floor, sheets or canvas may be spread under the sheep. As whoever reads this book will either be a shearer or have to employ one, it is needless for me to enter into any details of the process. When the fleece is removed the sheep is set upon its legs, its toes cut short with a chisel or toe-shears, and its owner's initials and its own number are stamped in lamp-black or venetian-red on the sheep's hind-quarter or side as fancy may dictate.

Sheep-breeders who wish to sell in the succeeding autumn are careful not to cut the wool close, but leave rather a thick covering of wool, say one-quarter to three-quarters of an inch on the forehead, along the legs, and about the scrotum, wherever, in fact, it is desirable to have a sheep look well wooled when he is offered for sale. This is not a fair practice, unless the buyer is notified, for it is impossible to judge in the autumn of the sheep's capacity for fleece. Ewes are not as often treated in this manner as bucks, as they are usually judged by their general appearance and lambs; but a buck may sire many lambs, and whether he is worth five or five hundred dollars depends on particular points of merit, a thick and uniform fleece being one of the most important.

Too many merino buck-lambs are raised in Vermont at present; the number of breeders has largely increased, and every farmer hopes to sell his buck lambs or yearlings for great prices, and therefore, instead of converting all but the undoubtedly most valuable into weathers, all passable bucks are permitted to grow up, with the hope that some few may sell the whole lot for high prices; as a consequence, they become a drug, and are peddled about the Western country, and often sold for a trifle at last, and when sold can do very little to improve the stock of those who purchase them.

As soon as the fleece is removed, the folder of the wool gathers it up in his arms, and lays it down on a large, clean table, the inside down: he carefully spreads it out to its full size, cleans it

from dung and other impurities, turns over the two sides to meet in the middle, folds over the ends, and then doubles it all together, and ties it in a firm square bundle with stout twine. As this is rather a nice job, and must be firmly and well done in order that the discolored surface may all be carefully closed in, and the fleece be neat and white, wool-boxes have been invented into which the fleece is laid after the ends are folded up. String being first laid across the box, the sides of the box are then pressed together, compressing the wool into the smallest compass; it is then tied with the strings which lay under it. A cheap and good box may be made as follows: Take a board,



a, *b*, *c*, three feet long and one foot wide, cut it into three equal parts, and attach *a* and *c* to *b* by hinges, then attach two boards same size *d* and *e* to *b* by hinges, screw two small hooks to *a* and *c:* when the fleece is twice folded lay two strong strings lengthwise of *a*, *b*, *c*, and two across *d*, *b*, *e*, at equal distances. Lay the fleece in the box, covering the central part; raise *d* and *e* to a right angle with *b*, then raise *a* and *c* to a right angle also; fasten the sides *a* and *c* into *d* and *e* by letting the little hooks attached to *a* and *c* drop into the notches made for them in *d* and *e;* thus the whole will be held compact: tie the strings tight, open the box, and you have the fleece solid well shaped; store the wool in a cool dry place; cover well from dust.

Merino sheep, partly owing to their thick, close wool, are but little troubled with ticks: such as there are will take refuge in the lambs as soon as they are admitted to the company of the old sheep after shearing. In a week they will be all in the lambs, and may then be all killed by dipping the lambs into a decoction of tobacco, which may be made by steeping "five pounds of tobacco to every one hundred lambs in hot water until the tea becomes strong enough to kill a tick as soon as it is immersed: or three pounds of white powdered arsenic are dissolved in six gallons boiling water, to which add forty gallons of cold water;"

in either case stir the solution, and immerse the whole lamb in it, saving the eyes, nose, and mouth. Keep it in the water long enough to soak the wool; then take it out and set it on a grating over the tub to drain; one dose will kill the vermin; it is a good plan to dip the old sheep in the same manner, as additional security.

When the ewes are sheared, their number, weight, and quality of fleece, and quality of lamb should be entered in the Sheep Register, that we may know in the fall to what kind of bucks the ewes should be bred. Ewes vary very much in their qualities; and by carefully noting the variations, we may increase or diminish any given characteristics by using bucks of like or unlike peculiarities. Vermont farmers often carry their ewes many miles, and divide their flocks amongst several different bucks, and are exceedingly particular as to the merits of the animals they use.

When the sheep are sheared, marked, and dipped, they are turned into pastures, where they are expected to range during summer. In some convenient place set a box, with some tar in its bottom, into which sprinkle salt and a little sulphur; or put in it only a lump of rock-salt and a little sulphur, so that the sheep may lick it as often as they wish; or salt them a little every week. Sheep will do very well in good pastures where there is no water, as they get the dew in the morning and evening feeding, and the juices of vegetation reduce their thirst; but water is very grateful to them, and they thrive better if they can get it.

With the exception of salting the sheep and occasionally tarring their noses, they are left to themselves until August, when the lambs are separated from the ewes, leaving with the lambs one or two dry ewes, or cossets, to keep them tame, and teach them to follow the shepherd. The lambs should be turned into the best pasture which can be given them, and far enough from their mothers not to hear them calling. In a fortnight they will have ceased to miss the mothers' milk, on which they have, of course, depended but little for some weeks. After the lambs are taken away, the ewes should be carefully watched lest their bags

swell: when they do, bathe the bag with warm water, and grease it, and draw a little milk out; they will then soon dry up.

As the feed on the hill-pastures gets short, move them on to the after-grass in the meadows. If the grass is very rank, let them stay at first only long enough to fill themselves with it, and then drive them back to the hill until their stomachs become accustomed to the new food, and their eagerness for it abates, when they may be left on the meadows until winter. It is very desirable throughout the season to change the sheep from one pasture to another; they improve more rapidly if their pastures are frequently changed, thereby being able to get a greater variety of food.

When the lambs are taken off the ewes is the usual time for looking over the flock, and drafting out by themselves the inferior animals, and the fat sheep which are to be sold during the fall. About the 10th October, if the ewes have not got fat since lambing, give them a little grain daily up to the time of buck-service, and for a week after. They are more sure to conceive and give their fœtus a vigorous start if they are themselves in good condition. The 20th October is time enough to begin to serve the ewes: a good adult buck will serve one hundred and fifty to two hundred ewes at the rate of five or six a day without harm, if he is well managed. He should be fed well, and only allowed to serve the ewes once; as the ewes come in heat at different times, the flock must be examined every day; and the quickest and best method is to put the ewes in a pen, connected by a door with a pen or room in which the buck is. Let them in one at a time, and as soon as they have been served, or prove not in heat, remove them; if served, mark them on one side with the day of the month, and record it in your register against the ewe's number. In this way you can examine a flock of ninety ewes in an hour easily, and save all the hurry, bustle, and injury to the ewes which is liable to occur when the buck is turned in to the entire flock: the ewes should be returned to the buck until the seventeenth day after service, as they will come about again within that period if they have failed to conceive the first time.

During the summer, the bucks must be kept away from the

ewes; if the bucks run together, they will fight more or less, but gradually get used to each other, and the weaker decline fighting with the stronger animals. About a month before their working season commences, begin to feed the bucks grain, half a pint a day, and increase until you give a quart of corn and oats mixed, with plenty good hay and fresh water. When serving-time is over, gradually discontinue the grain to the minimum which will keep him vigorous: good hay and a few roots during winter will be sufficient without grain.

After the middle of September, careful farmers house their sheep every night, and take them in whenever there is a prospect of continuous or severe rain. This practice may be carried too far, and the sheep's vigor be diminished by too much sheltering: they are able to contend with any reasonable weather; and unless one wishes to sell his sheep, and fears that rains will wash the wool, removing the yolk, and make the wool look dry and towy on the ends, he had better leave his sheep out during all moderate weather until winter. Carefully-sheltered sheep get to look almost black; the oil in the wool collects dust and dirt on the outside of the fleece and crusts it over, so that some very oily sheep would seem to have been painted with lamp-black; but when they are painted or rubbed with lamp-black to impart an artificial blackness, it is apparent upon careful examination; for, however severe rains a sheep may have been in, an oily sheep will be sure to show it under the belly and legs, and in all sheltered spots between the wrinkles, whilst no amount of blacking can make those places greasy.

I have described the year's management of a flock of merino sheep; but there would be no material difference if they were mutton and long-wool sheep. I have entered rather lengthily into the merits of the merino, because it is the best known, and because I believe that over the immense plains of the South and West, where the carcass is of little value, they will prove the most profitable. But there is unquestionably a field open to long-wool and mutton sheep of no less importance in the thickly settled parts of the country. Whether Leicester, Cotswold, Southdown, Oxfordshire, or Flemish sheep are to be the source from

which the American mutton-sheep will arise, time will show; but nothing is clearer than that, whoever can produce a sheep which will come early to maturity, yielding lambs which will weigh eight to ten pounds to the quarter, and sheep fifteen to twenty-five pounds to the quarter, which is hardy, a good worker, adapted to our rough hills and briery pastures, will realize as great profits as Mr. Hammond, and will find an immense sale for his stock.

There are several gentlemen now engaged in the business, with various success. Most of them are too rich to feel the acute interest in the subject which makes a man keenly alive to all the considerations which affect stock-raising. Not by any means every man who loves animals and keeps them is competent even to begin to raise an improved breed of any kind: it requires a peculiar quickness to see and appreciate the good and bad points of animals; a readiness to remember how each animal he has bred resembled or differed from the rest; a power of combining facts connected with his own and others' breeding, and deducing from them the theories which can be followed to a successful conclusion.

The man who is to make an improved breed of sheep will very likely know nothing else: he will see sheep, think sheep, dream sheep. They will be always present in his mind; and such a man will yet be found to produce the American-mutton sheep, and he will reap a golden reward.

An improver of foreign sheep, in adapting them to America, will find many unexpected obstacles, in climate, soil, and food; and when he has overcome them all, he will very likely have an animal widely differing from the parent stock. The merino-breeders, after having attained great excellence, thought they could, perhaps, get on faster by importing new and superior animals from Spain; and several competent persons went to Spain and other European countries to examine the flocks in their native localities, ready to pay any price for first-rate stock; but no importations were made which were equal to the sheep already here. This seemed strange, and unaccountable upon any other theory than that the sheep had deteriorated in Europe.

Some of the Spanish breeders claimed that the French invasion had broken up the flocks, mixing varieties; and that, since that invasion, no breeders had taken sufficient care to restore their animals by careful management. I do not believe that this is the cause of the apparent depreciation. Our best farmers are satisfied that their sheep can be much more surely improved by keeping them in small flocks, and will divide even fifty sheep into three or four flocks, when they have room. By this plan, each sheep gets a better chance at the food than when many are pushing at the same time. The shepherd can easily study each individual, learn its defects, and decide how to breed to improve its progeny. During the season, each sheep is studied carefully, and defective animals sold; but in Spain, the flocks vary from hundreds to thousands, owned by a few rich men, and managed by hired shepherds. Although the best men are got for shepherds that can be hired, no hired man can be expected to take the care of his master's sheep, and feel the intense interest in improving them that he would feel in his own, where every improvement would give him money and reputation.

If a few extra sheep were to be imported from the best of the Spanish flocks, and divided amongst men like the Atwoods, Humphreys, Hammonds, Spragues, Buels, Griswolds, and Campbells, who have improved the American merino, in another forty years there would be sheep derived from them so greatly in advance of the imported progenitors, that they would seem to have been of an inferior variety, could they be compared with their descendants.

Improvement in stock-raising in America is the most promising and profitable business to which any farmer can turn, and will prove a surer mine of wealth and fame than the gold, coal, oil, and copper-mines, which seem to our farmers to be the short and tempting roads to prosperity.

CHAPTER VIII.

ORNAMENTAL GROUNDS.

In the first edition of "Country Life," I have discussed very fully the advantages of living in the country, the beauty we may find there, the principles which should govern us in selecting our homes, and arranging them afterwards; but I said little or nothing about cities. It might seem that cities were to be denied all participation in natural beauty because they are the places in which men live for the convenience of business and social intercourse; but this would be a very narrow view of the subject. I believe every city offers abundant opportunity, if it is well improved, for the cultivation of flowers and flowering-plants; and often, in their parks and public gardens, may be found the finest opportunities for producing beauty with earth, grass, and trees.

As I propose to devote some space to this branch of the subject, I will first draw the reader's attention to some of the prominent defects in the present treatment of public grounds in cities; and, as I am best acquainted with Boston, I shall apply my criticism to that city, conscious that what is true of one is applicable to all.

The necessity of large and frequent open places in cities to promote the health of their inhabitants is universally admitted; and when land is set aside for such purposes, it has always been considered proper to plant it with trees; but hitherto very little care has been taken that such plantations should be made with any other view than to furnish abundant shade. It has been taken for granted that a variety of trees will not flourish in cities; and, therefore, the plantation is always of the same kind, and of very few varieties. Elms, lindens, horse-chestnuts, and latterly maples, are planted in endless repetition; and either indolence or ignorance prevents any earnest attempt being made to plant

the many other forest trees, some of which are more beautiful, and less liable to the ravages of insects and premature decay.

Let us consider, first, the Boston Common, a very undulating and beautiful surface, of about fifty acres, with several hills of considerable elevation. Nature seems to have given man a chance here to produce something beautiful; and, according to the reverential enthusiasm of generations of Bostonians and New Englanders, man has done so. But, in truth, man has done nothing towards improving this beautiful surface. Regardless of the undulations which imperatively demand that the foot-paths shall follow the hollows, or gently wind up the hills, every path was carried as straight as the compass could run it, careless of how or where it should strike the hills, or cut the valleys. If such straightness came awry to a valley, and made an awkward hole, the surveyor ruthlessly filled up the valley, and destroyed its undulatory beauty.

The lesson that Nature teaches us, that the cattle practise, that is the foundation of the river's pliant power, has been neglected: the crookedness of Boston streets, which are a real inconvenience to traffic, are shamed by the straightness of the walks and paths over the broad field which has been preserved for the health and beauty of the city.

The broad, straight malls, with their double rows of trees, were well enough: their stately formality bordering the noisy streets seems to bring us by gentle gradation into the presence of the quiet beauty of the Common itself; but with the malls, the demand for straightness and formality ceased. When we look at the surface, and see how by planting the trees in groups on the hill-tops and sides, winding the paths around, rather than forcing them over the undulations, we might have broad lawns and open grassy play-grounds, ornamented by trees and shrubs, which, well placed, would have made the surface appear still more diversified, all now sacrificed to the straight paths which have been cut across it, each defended by rows of lindens or maples, like so many grenadiers on guard, we feel that man has thrown away the whole to take a part.

The plea of convenience does not weigh in the argument, be-

cause we all know that a curve is no shorter when it stands upon its diameter, as a base, than when it lies on its side. Paths, which would have wound their way through the hollows, gently ascending the hills at the easiest angle, would have been as short as those which now go straight from point to point, and would have cost less and have granted opportunities for skilful planting now gone forever.

The ignorance or carelessness which made these paths has been farther exhibited in the plantation, which is mainly composed of three species of trees, the elms, maples, and lindens; and lest these trees might really be too beautiful, the city causes their stems to be yearly scraped and painted with a filthy mud-wash which removes all the color and variety of the lichens from their trunks.

No one can deny that the tops of the elms in their dignity and grace, with their beautiful tracery of branch and twig against the sky, are truly beautiful. The foliage of the maples and lindens is very refreshing in the hot summer days, and the dullest person must feel real pleasure in seeing on some bright spring or summer evening, the gay children, happy people, bright sky, blue water, golden yellow grass, rich green foliage of the Common; but all this is only a part of what might have been, and should teach us the more loudly to condemn those, who, from ignorance or design, have mutilated the beautiful pleasure-ground we might have had.

When the artistic world is startled by the discovery of some grand old Torso, or fragment of Grecian sculpture which has lain under the dust and ruin of ages, but which, when exhumed, shows us how great was its conception and execution, do you think it is admired the more because it is mutilated? Far from it. The artistic soul enjoys the beauty which remains whilst mourning the mutilation.

This should be the sentiment with which we should think of such wasted opportunities as the Common. Why are elms, maples, and lindens planted row upon row? Because they are the only trees worthy our love and admiration? Beautiful as the elm is, the Venus of the forest, shady as the linden with its

sugar-loaf of foliage, glowing and grand the maple with its redundant wealth of autumnal colors, like a painter's palette, on which are gathered together the yellow and red of the brilliant summer sun, yet stationed in rows, with no grouping of one against the other, lending and receiving no new glories by harmony and contrast, they are deprived of the largest part of their power and beauty.

What have the oaks done, so sturdy of limb, rich in leaf, grand in outline, earnest in autumnal color, to be shut out, especially when they do not bring worms to spin their gay cocoons, filling the air with swinging acrobats, whose crowning feat is to catch on the bonnet and hat and dress of the passer-by? Why have we no knowledge of the beeches, whose sumptuous green of summer is turned to a still more sumptuous yellow in the autumn, making our northern hills golden for many weeks?

Have the richly clad hickories, whose irregular and graceful branches and lithe ascending stems are of surpassing beauty, committed the deadly sin, and been therefore excluded? Is the fact that they bear nuts to condemn them to the orchard, and exclude them from the ornamental grounds?

For what faults of omission or commission are the feathery pines, the picturesque and kingly hemlocks, the graceful Norway spruce, shut out from the sight of Boston men, women, and children?

There are thousands in that city, whose only idea of evergreen is the trimming material brought in to decorate the churches at Christmas, or to make the Christmas-tree; who, if they think of a tree at all in winter, think of it only as stripped of its clothing of leaves to offer as little resistance as possible to the wintry wind. Transport them into one of our pine or hemlock forests in winter, where the thick branches sift the sharp cold out of the winter wind, and they would think they had been the subjects of a conjurer's hocus-pocus.

Men who plant public grounds are often ignorant themselves of what trees are; they have often only seen to know by name, the elms, maples, and lindens of city streets, and when successful business or politics have placed them in authority to dictate

as to the laying out of public grounds, they naturally desire the only thing they know about. It is a positive wrong committed on the public, who cannot go out into the country to learn its beauties, and see the trees and shrubs.

One who plants for the public ought to be true and generous to his employer, and instead of wilfully deceiving him as to what he might have, giving only the easiest got and commonest varieties, he should try to bring together a good collection of the beautiful inhabitants of our woods. There is no reason why we should not plant every variety of trees on a large area, like the Common. The narrowness of the street, the too great shade of the houses, which may be quoted to prevent the planting of some kinds of trees in the streets of cities, are no argument here, where every tree and shrub of New England would grow and thrive.

South of the Common is an area of about twenty-five acres, called the Public Garden. This garden is a vigorous effort of an enthusiastic person in the wrong direction. The original surface was a dead level, much of it made from deposits of city rubbish. Conscious of the mistakes made in the Common, where the irregular and graceful had been sacrificed to the straight, and not comprehending that under some circumstances the surface demands straight lines as imperatively as in another curves, the designer of the improvements, taking before him a piece of paper, the surveyor's plan of the surface, laid out thereon a series of ovals, circles, and curves, meaning nothing, leading nowhere, the paths serving rather as a bewilderment and aggravation than either a convenience or pleasing effect.

The reader of the previous pages of this book needs not be told here, that I believe in sometimes treating level surfaces with graceful lines, curves, and irregularities; but I have laid down as an axiomatic principle, that curved lines on level surfaces are justified only by real or apparent necessity.

If you have no hill or variety of surface to cause you to bend out of the straight line, a group of trees or shrubs, a building or flower-bed, some real obstruction, should be created to give a real as well as apparent reason for the deflection.

But in this design no such idea prevailed. An oval or a circle, or some geometrical figure, looked nicely on paper, and they were therefore transferred to the ground; what was to be done with them afterward seems to have had nothing to do with their first conception.

Nor is there any harmony of detail. This design could only be excused by the dead level of a Dutch tea-garden, where petty conceits and surprises, paths leading nowhere or ending in a seat or bower, a place to be enriched by frequent flower-beds and architectural ornaments, and to have all the peculiar elaborate details of the artificial French school, is considered the height of perfection. Into this plan has been introduced, apparently borrowed from some design for an irregular surface, several moderate alterations of the surface, and a pond of regular irregularity of outline, which serves to utterly distort it, and destroy what merit it originally possessed.

As has been said, it is perfectly legitimate to wish to introduce a variety into a level surface. Taking the dead level as a base, laying out a pond of such shape as seemed best, giving the shore variety by raising it in some places, leaving it natural in others, carrying the raised portions back into little hills or undulations to give a surface, around and amongst which paths might wind giving new charms by the variety produced, would have been legitimate; but the heterogenous combinations of the Public Garden are inexcusable and very ugly. The Common is great in spite of its abuses: the grandeur of the surface will make itself conspicuous, and compels admiration however much it has been distorted; but in the Public Garden the deformity cannot be concealed, and is as incongruous as the fool's motley over a parson's surplice.

When we leave the arrangement of the surface, and come to the planting, there is no improvement, the previous faults sink into insignificance. The first excuse of the changes of surface from a level is to get places on which to raise plantations above the usual surface, by which, with well-selected groups and varieties of trees, we may increase, indefinitely, the real variation. By taking advantage of each change, however small, we may pro-

duce an effect perfectly incomprehensible to the uneducated mind; but in this garden no such thing has been done: indeed, the word plantation has no meaning when applied to it. In spring and summer there are gay flowers and bright grass, and some very common trees and shrubs, some roses, some azalias, some, I should say much, of many things arranged with no more eye to harmony, contrast, and combination than if they had been sprinkled from a pepper-pot.

Nor is the poverty of design compensated by richness and variety of material. I have never seen so many ordinary, cheap, and poor shrubs and flowers got together, excepting in a nursery; the shrubs are mostly lilacs, snow-balls, syringas, common roses like the boursault, spireas, and herbaceous plants of the most ordinary character. In summer, there are rich bedding-plants and a profusion of bloom; but the general material used for planting seems to have been bought at a miscellaneous auction, because it was cheap; and having been purchased, it must be used somewhere, and, alas, here was the spot!

I would not deny the beauty of color anywhere; it is as glorious and enchanting as music; and nature will be beautiful in spite of man's efforts to prevent. The delicate or rich green of the newly-shaven grass, the sparkling water, the rich masses of salvia, geranium, heliotrope, and verbena, make the Public Garden an attraction not to be lost from the Boston world, and they do much to reconcile one to its obvious failure; but, granting it all, it is a pitiable apology for what might have been.

This area, which will be surrounded by the finest architectural dwellings money can produce, should have been so arranged with groups of trees, conservatories, rich gardens, open play-grounds, fountains, basins, shrubberies, that it could have rivalled any foreign garden of its size, and been a spot to which a Bostonian might gladly take an acknowledged master of the art of landscape gardening, sure of his approbation.

Stretching away from the Public Garden is the broad Commonwealth Avenue, of sufficient width to permit a continuous line of planting in its centre. In the original plan for the avenue, it was proposed to introduce through its entire length a se-

ries of little openings, — I hardly know what specific name to give them. To add still more to its glory, the houses are all to be set back from the very broad side-walks, leaving large areas in front of every house.

The avenue is partially completed; and although, so far as it is made, it is planted in the usual way, there is still left an opportunity for a grand treatment. Of course, every one can suggest that these centres should have some plantation; but to be content with introducing a double row of trees, as is now proposed, through its length, is partially throwing away a chance for one of the finest effects.

Let the avenue be treated as a whole, the sides as well as the centre; although each one of the areas is small, plant them artistically. Supposing, for instance, that it has been decided that in the centre we are to have nothing but trees; introduce, in successive groups, all the trees which will endure our climate. In the first space a group of pines, next hemlocks, alone or mixed with other trees of the same genus, or the Norway spruce; then a group of maples, then oaks, then beech and walnut, then a combined group of several varieties, then the many members of the ash family, and so on. Or, better still, devote some of these spaces to shrubbery; bring in groups of shrubs among the trees, thus breaking the monotony of trees, and again combining shrubs and flowers, and at another place shrubs, flowers, and trees.

At the same time, carry the hand of culture and nature's decorations to the areas in front of the houses, which afford, as I shall show, a field for a great deal of pleasure and beauty.

The Public Garden should have been laid out and planted so as to produce the utmost beauty the space could afford, and then have been connected by the grand avenue with some large park, yet to be made in the new land near Roxbury, where there could be a large basin of water kept ever fresh by the Charles River or the changing tide.

Treated in some such manner, the beauty would increase each year; and, eventually, the combined avenue, trees, shrubs, flowers, parks, and buildings would have become a splendid ornament to the city and the surrounding country.

The question of how best to treat our cities is not to be passed by carelessly; we are planting towns and embryo cities every year, and their future health and prosperity, as well as beauty, will depend on their being laid out and planted in the best manner. It is worth our while to consider the question at once, both in the old cities of the land and in the villages which are springing up everywhere, some of which are certain, in time, to rival the most populous cities of the present day.

CHAPTER IX.

CITY AREAS.

I WILL now give some directions for the treatment of small city areas, the few feet in front of houses which are often catch-alls for scraps of paper and rags, and tenanted by a little rank or half-starved grass. A primary objection to the culture of plants and flowers in cities, is, that they will be broken and stolen by thieves; but, first, I do not believe they would be stolen; second, this is not a treatise on police management.

The directions I shall give are based on the belief that what is worth doing at all is worth doing well, and that we know that any kind of horticulture is attended by difficulties. Whoever wishes to have his house adorned by flowers, shrubs, and vines, must realize at commencement, that he will have a great deal of trouble and labor. You cannot thrust a few bushes into the ground, set a vine against the wall, attach a plant-box to a window, and then give yourself no further concern about them. When you have planted you must cultivate, prune, train, and protect, sure, if you do not, that all previous preparation was wasted, and that, if you do, you will have a great amount of real pleasure.

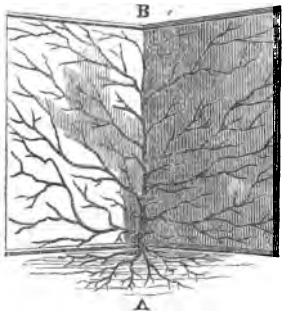
Again, my directions will not apply indifferently to all kinds and styles of houses; a small and unpretending house, such as the thousand live in, may be clothed with shrubs, flowers, and vines, it mattering but little how they are carried over the surface. A costly house, with rich architectural finish and ornaments, should be very carefully approached, and only those plants applied to it which will harmonize with its style of architecture; and, whatever we plant must be carefully pruned and trained, each year, so as to remain subordinate to the architecture.

But for expensive houses and rich owners I shall give no directions; if they want aid, and the presence of natural beauty, they can afford to get advice when they need it, and thus they make sure to produce a harmonious result. Nor can I give, at the same time, directions for the shaded and sunny sides of the same street; houses erected on the south side must treat their front areas differently from those on the north side of the street.

Moreover, the space allotted to houses differs in every street; in some they are flush with the side-walk, no space being left even for a vine; in others there will be ten, in others twenty feet of area, and I shall not give details for all; but this, I think, may be assumed, that what is possible for the area of twenty by thirty is proportionately so for ten by thirty, and when there is but a foot or two, although the resident must dispense with the flowers and shrubs, he can have the vines, and plant boxes that his more lucky neighbor uses as a part of his improvement.

In the few square feet of a city area we must not strive for grand effects, but must rest content with pleasant color, fragrance, and variety. Though in a small way, in our beds of bulbs and bedding-plants, even in cities we can get contrasts and harmonies of color.

It may seem, when one examines the plans I have subjoined, that I have overcrowded the space; but I expect that constant care and pruning will keep all the plants and shrubs in their proper bounds, and many of the largest shrubs, as the cydonia japonica, could be trained directly on the fence, like an espaliered fruit; its thorns would deter any thief from putting his hand through to gather the flowers, and its rich coral blossoms in the spring, and dark green leaves in summer, would be very beautiful. A, B, represents corner of fence and stem of cydonia.



In order to get the utmost beauty from the city street, several persons living in contiguous houses should combine together to arrange and plant their areas according to a definite plan, one person giving especial predominance to roses, another to azalias, another to flower-beds of bedding-plants, another to evergreen shrubs. In the spring, one devoting most space to hyacinths, another to tulips; and later, one to the gladiolus, another to Japan lilies, another to Cape bulbs, another to verbenas or petunias. The small plots planted in this way would be like the flower-beds of a large garden, and though the different owners would have no right to gather each other's flowers, they would share the pleasure of seeing them, and could try experiments and produce a variety of plants utterly beyond the efforts of one or even ten persons.

The same method should prevail in treating the house-front or façade; let one plant against the house be running roses, another honeysuckles or woodbine (Virginia creeper), or bignonia, &c.

If we extend this kind of improvement to its utmost capacity, by attaching hanging boxes of plants to the windows of the houses, we could make many a city street more varied and beautiful than any country village.

If trees are wanted, plant them in the same manner; take care not to put the trees so near as to over-shade the flowers and shrubs, and select such a variety as the space permits, which would give the street a great interest to strangers and residents, and teach the dwellers in cities, how varied and beautiful our fresh trees are.

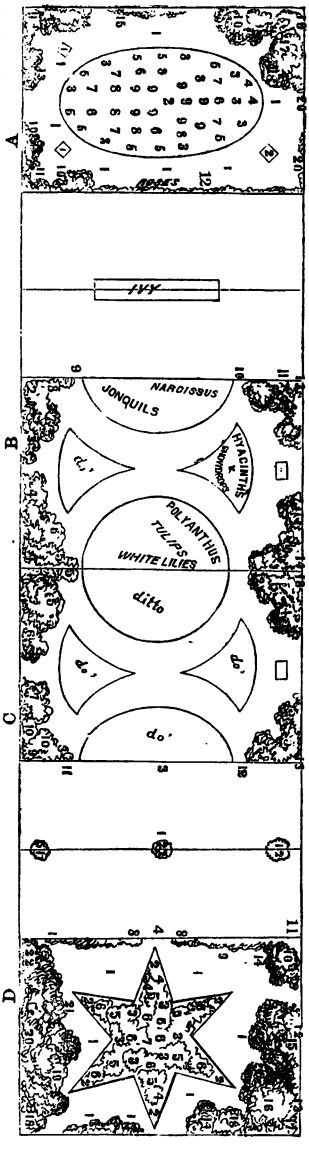
I will give a detailed treatment for a large area, — where I suppose the houses to have a front of thirty feet, and to be thirty feet back from the street, with walks leading to the house six feet wide; the fences separating the different houses and areas are to be used as trellises for various vines, as well as the front fences and the wire fences separating each walk from the area belonging to the same house.

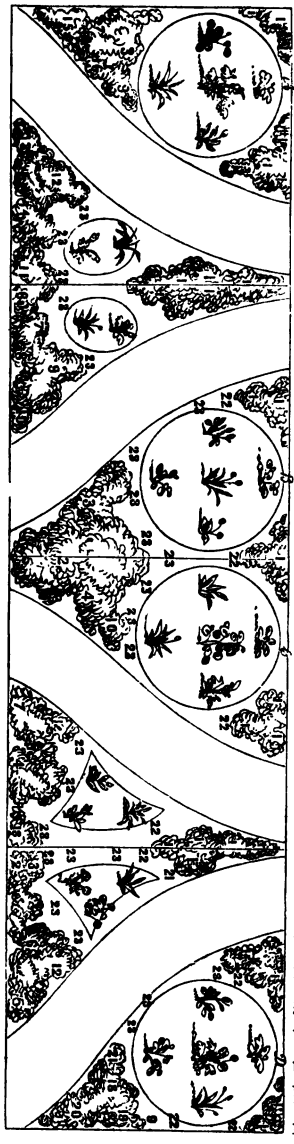
Flower-bed bulbs.—1, snowdrops; 2, crown imperial; 3, polyanthus; 4, crocus, all around the edge; 5, iris; 6, jonquils; 7, narcissus; 8, hyacinth; ⊓ vase for trailing plants; ⊓ basket for trailing plants; flowers to follow bulbs, edge with gazania splendens, centre with Mexican sage, verbenas next edge, then heliotrope and geranium; 10, climbing roses; 11, cydonia japonica; 12, ivy on fence; 13, mahonia; 14, standard rose; 15, trailing rose; 16, double flowering almond; 17, spirea prunifolia; 18, perpetual roses; 19, woodbine; 20, cobea scandens; 21, rose.

Shrubs for B: 1, spirea punifolia; 2, forsythia viridissima; 3, spirea gracilis; 4, rosa acacia; 5, clethra; 6, azalea pontica; 7, perpetual roses; 8, black alder; 9, woodbine; 10, tropeolum; 11, wigela rosea; 13, woodbine; 14, trumpet creeper; ⊓ vase. Flower beds of B and C: crown imperial next fence; then narcissus and jonquil, small beds; hyacinths and sundries; large circle, edge with polyanthus; then tulips and white and Japan lilies against fence.

Shrubs to C: 1, prairie rose; 2, honeysuckle; 3, honeysuckle; 4, privet; 5, roses; 6, mahonia; 7, shrubby cinquefoil; 8, azalea pontica; 9, cydonia; 10, phlox; 11, Roxbury wax work; 12, honeysuckle; 13, Dutchman's pipe. Between C and D, on fence: 1, rose; 2, honeysuckle; 5, woodbine; 6, ivy.

D, after bulbs: Centre with salvia, next scarlet geranium, heliotrope, points with verbena, gazania, nierembergia and mignonette; bulbs, 1, snowdrop; 2, polyanthus; 3, jonquil; 4, crocus; 5, hyacinth; 6, tulips; 7, crown imperial, after these in place or with bedding plants use Japan lilies, gladiolus, amaryllis, and other Cape bulbs; 8, honeysuckle; 9, roses (running); 10, wigelea; 11, woodbine; 12, clematis; 13, cobea scandens and woodbine; 14, roses; 15, azalea pontica; 16, daphne mezereon; 17, black alder; 18, snow ball; 19, clethra; 20, English privet; 21, roses; 22, spirea; 23, tropeolum.



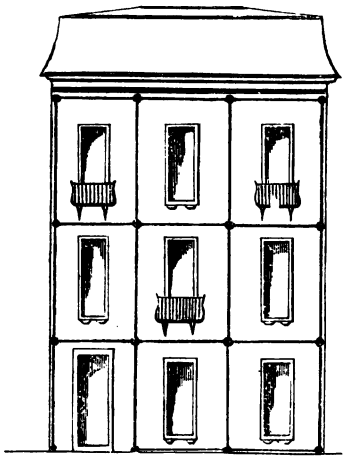


Many of the evergreen shrubs, and particularly the new variegated kinds, would be especially interesting to city amateurs, but I should recommend them rather for the shady sides of the street; and I fully believe that on the shady side, the most beautiful rhododendrons and, kalmias, and where the space would permit, pinus cembra, ilex laurifolia, American holly, andromedas, juniper, would live and thrive. As city gardening is a novelty, there would be constant opportunity for experiment, and we should undoubtedly find many shrubs doing just as well in the city as the country; whilst others, of which we had reason to expect better results, would die, unable to contend with the dust, smoke, and confined air.

1, perpetual roses; 2, holly; 3, black alder; 4, euonymus; 5, privet; 6, kalmia; 7, clethra; 8, wigelea roses; 9, azalia pontica; 10, roses; 11, spirea prunifolia; 12, deutzia scabra; 13, rose acacia; 14, cydonia (on fence); 15, spirea corymbosa; 16, standard roses; 17, daphne mezereon; 18, forsythia viridissima; 19, shrubby St. Johnswort; 20, barberry; 21, double flowering almond; 22, fuchsia; 23, snowdrops.

In this plan, by turning the paths out of the right line, we are enabled to get masses of shrubs together, which would be very effective. We might introduce some of the small evergreens, like pinus cembra or deciduous trees, like chionanthus (the fringe tree), cornus florida, halesia (silver bell), cranberry tree, the snow ball, magnolias, and others.

I have given, first, two arrangements of large areas; now let us turn to the front of the house, where the vines are to be trained over the surface. To relieve them from the heated radiation from the bricks, a simple wire-trellis like that shown in the cut should



be made, covering the brick-work, and raised four or six inches from its surface. The construction of the trellis is very simple: drive in between the bricks, eye-bolts, or pins of stout wire, say one-eighth of an inch in diameter, sharpened at one end to drive in, and turned into an eye or loop at the other; drive one at each side of the lower window, and one between, just at the edge of the underpinning; drive again at same relative positions over the windows of each story. Then take a wire about one-tenth of an inch in diameter, and fasten to the top eye-bolt; bring it down through the others, and fasten at the bottom; you can cross wires as often as the vines need. Paint these wires dark-brown, and they will be inconspicuous, and yet answer the purpose of supports to the vines perfectly; and as there will be sufficient air-space between the trellis and the wall, there will never be any danger of burning the foliage of the vines. The only danger to apprehend is the over-stimulating effects of the spring sun, which, as I have before described, causes the destruction of our partly acclimated plants, by starting the sap too early, which freezes, thus bursting the sap-vessels when the cold returns before the mild weather is fully established.

Under each alternate window of the different stories, suspend a box, which may be made as graceful in shape as you please, of two-inch plank, or of common boards; the box to be supported by clamps from the window-sills, or brackets of wrought iron, let in

to the brick-work. Such plant-boxes should be about two feet deep and wide, and as much longer than the window as one can easily reach from either side.

Fill six inches of the boxes with broken crock or stones for drainage; then three inches of broken bones and pieces of leather; over this fill a rich, light loam; to make sure of its quality, it would be well to prepare a compost similar to that described on page 10 of this book. In such a box, we can grow what we please, — plant along its front edge, verbenas, nierembergia, gilia, mignonette, maurandyia, and let them hang down in the air, showing their beauty of form and color, as a fringe to the box. We might commence the season with a collection of spring bulbs, to be followed by Cape bulbs, like ixia, cyclamen, amaryllis, sparaxis, homeria, nerine, tuberose. All these bulbs should have been started in some greenhouse, and be set in the boxes after the spring bulbs have gone.

In lieu of the bulbs, use the bedding-plants or annuals; set at the corner of the boxes, tropeolum, or convolvulus, to cling to the nearest wires. Be careful to select only those climbing-plants which will run of their own free will when once they are attached to the vine, as it would be troublesome, and to a careless person dangerous, to get out by ladder, or painter's window-jack, to train the vines.

It needs but a feeble imagination to summon up the rich picture such a house would present to the eye of the owner or of a stranger. Were there no back area to be improved, we could get from the front, end, or side of a house a great deal of satisfaction and a large quantity of flowers.

I will now introduce a plan for a series of houses, with but ten feet front area, the length of the house, or say two hundred square feet.

Crocus, on the edge ; 2, groups of polyanthus ; 3, jonquil and narcissus ; 4, hyacinth ; 5, tulips ; 6, snowdrops ; 7, cydonia, on fence ; 8, plants on staging in pots ; 10, rose ; 11, rose and honeysuckle. The corners next the house could be occupied by staging for plants carried as high as the owner wishes.

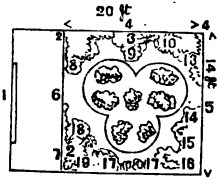
1, roses ; 2, honeysuckle, on fence ; 3, privet, on fence ; 4, forsythia viridissima, on fence ; 5, mahonia. In a very small area, large shrubs, unless well confined to the fence, would crowd, and lose their beauty below, only showing leaves and flowers on the top. In the crowded space, dirt and rubbish would collect.

1, snowdrops ; 2, cobea scanden ; 3, black alder, trained against fence ; 4, deutzia scabra variegata, on fence ; 5, trumpet creeper ; 6, sweet briar, on fence ; 7, cobea scandens ; 8, Dutchman's pipe ; 9, lilies of the valley. Stand of flowers against house with five steps ; verbena, roses, geranium, heliotrope, fuchsia.

1, roses ; 2, spirea prunifolia ; 3, privet on fence : 4, clethra ; 5, rose acacia ; 6, crocus, on the edge ; 7, polyanthus, in groups ; 8, hyacinths ; 9 tulips ; 10, rose ; 11, honeysuckle. If the area is depressed much below sidewalk, bedding plants or annuals might suffer from want of sun, in which case, a raised flower-bed should be made to bring them up to the light.

But there are areas not more than fourteen feet square, and some smaller; the greater the depth in proportion to the length the better the chance for planting.

I give one now fourteen by fourteen, with walk to house fourteen by five feet.



Flower bed, bulbs followed by bulbs or bedding plants: 1, ivy; 2, woodbine; 3, honeysuckle and bignonia; 4, roses; 5, tropeolum; 6, honeysuckle; 7, woodbine; 8, roses; 9, azalias; 10, deutzia gracilis; 13, dwarf wigelia rosea; 14, symphoria zacemosa; 15, dielytra spectabilis, variegata; 16, variegated tartarian honeysuckle; 17, standard rose; 18, mahonia; 19, kalmia; 20, roses on fence.

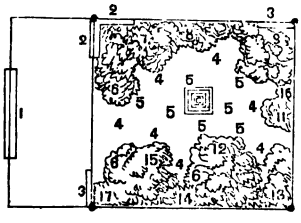
For areas on the shaded side of the street, the treatment must be entirely different: we can have snow-drops and lily of the valley; and probably some of the other bulbs, like the hyacinths, will blossom pretty well; but the want of sun would be a fatal objection to most flowers.

But shade would be no objection to evergreen and variegated shrubs; of these, many varieties have been introduced to notice during the last five years, and the shaded side would be especially favorable for ivy. You must not expect the blossoms of any plants, even evergreens, to be as brilliant in the shade; but the foliage will be very rich, for it is not the severe winter cold that kills our evergreens, but the sun of spring and late winter. On the contrary, it is the sun of summer which kills many of the leaves of the variegated leaved shrubs. The white places in the leaf are practically diseased portions from which the chlorophyl or coloring matter is absent; when these leaves are exposed to the hot sun's rays, they are burned up.

I venture into this part of the subject with diffidence, because this experiment has never been carefully tried, although analogy is decidedly in its favor; for in the country we always select the north sides of hedges, groups of trees, and the like, as the best positions for both these evergreens and variegated plants.

All the variegated shrubs require only good, well-drained common garden soil. The evergreens do better for having incorpo-

rated into the soil lumps and fine particles of peat; but both should be well drained.



Plan for shaded side of street: 1, ivy; 2, woodbine; 3, ivy; 4, snowdrops; 5, lilies of the valley; 6, mahonias; 7, rhododendron; 8, rhodora canadensis; 9, kalmia; 10, golden box, evergreen euonymus (half hardy, covered in winter); 12, sweedish juniper; 13, rhododendron; 14, ilex laurifolia; 15, silver box; 17, kalmia. Wherever I have given kalmia, I mean K. latifolia.

In these several plans I have used the same scale, twenty feet to the inch. I have planted the shrubs too thickly, were they to be left unthinned, as they would ultimately crowd and injure each other; but I have set them thickly to get an early effect, believing that the planter will have sufficient sense to cut out and prune closely before the plants begin to crowd each other.

I have been thus precise and full in my treatment of the front areas, because they are generally most open to the sun; but I do not forget the back of the house, where there is generally much the largest space. The back areas are very often deeply shaded by high fences and surrounding houses. Whatever room there is should be improved. On the sunny sides, I should prepare the soil thoroughly, and plant grape-vines and fruit on espaliers. In the ground at the roots of the trees and vines, we may have bulbs and flowers; but the necessity of using most of the back area for household purposes generally forbids the introduction of shrubbery.

Mr. R. McCleary Copeland, the Librarian of the Massachusetts Historical Society, has shown triumphantly, that great success in special culture may be had in the city. He has cultivated for many years in a small back yard, hyacinths so successfully as to take the first premiums offered by that society. These beautiful flowers were grown in a grape-border, an Isabella grape occupying the wall above it; the hyacinths being replaced, when their time of bloom had passed, by Japan lilies and other bulbous plants, and later by pot-plants, which had passed the winter in the house.

In a very confined area not nearly as large as the one first shown,

Mr. Copeland has raised great quantities of flowers, and, as he says, "plenty of grapes."

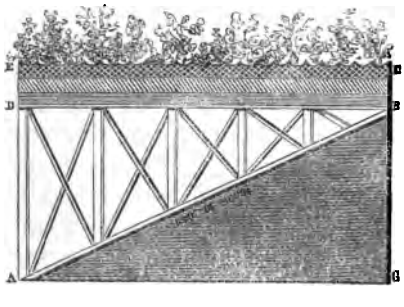
In plan on p. 884, I omit the planting of bulbs, as from what I have said any one can combine for himself; also, I have made the plan more simple by using the same numbers to designate the same plant on the four plans.

There is no need for me to dwell any longer on this part of my subject. I have given details in the earlier portions of this book which will readily teach whoever wants to improve his back-yard, how to do it; on the shady side we can only hope to succeed, as on the south sides of the streets, by planting those things which do not require sun.

Let us now go up on to the roof of the house, not for the view, but to see the opportunity it affords for greenhouse, conservatory, or even garden-culture. I do not mean the roof of the six or seven-story house, but of the projecting L, and the lower parts of the house.

Many city houses have a long, low shed, and often a two-story elevation over the whole or a part of the back yard and kitchen, which may be used for garden or green-house; in the latter case, heat might be supplied from the kitchen-range, or the furnace. In as small space as twenty by fifteen feet, we could have a collection of plants, a cold grapery, or a cold peach-house, that would be perfectly satisfactory; or, if we do not want to be troubled with glass, make the roof strong enough, and lay out a garden there.

Suppose A, B to be the slanting roof of such projection; B, C the front of the house to the yard. Carry up the posts A, D, and lay a strong floor over the area B, D; then plank up the sides D, C, E, F, eighteen inches or two feet deep; lay a bottom of coarse materials and broken bones for drainage, and fill with compost. Any thing will grow here, and



you can make the house-top as perfect a flower or vegetable garden, so far as its size permits, as if it were on the ground. I know there are objections: first, the weight on the walls of the house, — strengthen them; weight and trouble of snow in winter, — shovel it off; trouble in getting up the materials and watering, — generally it would be watered by the rain, and the materials once carried up would be there forever.

Many of the far-famed hanging-gardens of Babylon were, doubtless, made in this way; and it requires but a feeble effort of the imagination to see the beautiful addition such gardens would be to city houses.

I do not give minute details for this arrangement, because the simplicity of the garden is obvious; and when any one wishes to have a greenhouse, or other planthouse, he would naturally get advice at the time, as the peculiar shape of each roof, and its exposure, would require special arrangement.

CHAPTER X.

HOW TO PLANT TREES.

I HAVE spoken of the overcrowding of city areas, and in the earlier part of the book (see pp. 760, 763), of the evils of overcrowding plantations in the country, but I think, before leaving the subject, a little more might be said; for there is really no more serious mistake made in ornamental planting.

Whether one plants for himself or employs a landscape-gardener, he wants to get as immediate an effect as possible. Life is short, and very uncertain for all; and when a man has reached the age of forty to forty-five years, and but few Americans are ready to make a country home at an earlier age, his chances of life are less than those of younger men. But take heart! seven years will make a plantation where the trees will be from fifteen to twenty feet high: good trees, well planted, grow very rapidly; and, if the trees have been well combined with shrubs, in seven years we may convert an open field into a thicket.

Few men believe, when they plant trees, that they shall be unwilling to cut them down at a suitable time; but when the tree we have loved and protected gets lusty and well developed, it seems almost a sacrilege to cut it down. Nor can many men realize how much beauty and protection may be got from well-grown and well-selected shrubs; they have always associated the idea of trees and country together, and they do not understand a plantation which does not give shade.

Shade is very desirable in hot, summer days, and we should be careful to provide it somewhere near the house; but a little will answer for comfort, and, having secured that, we should arrange the remainder of our plantation with a strict regard to the beauty we can produce.

Many persons, who have made plantations within the last ten years, and who thoroughly love and understand trees, and who thought their trees were far enough apart, are already compelled to cut them down, or cut off the leading shoots to delay their growth, and devise all kinds of plans to prevent the trees they do not remove from injuring each other.

This difficulty could be avoided in small places, by planting only the low-growing trees and tree-like shrubs, such as

EVERGREEN SHRUBS.

RHODODENDRON, — varieties.
KALMIA, — latifolia.
ILEX, — laurifolia, scottica.
MAHONIA, — aquilegifolia.
ARBOR VITÆ, — varieties.
JUNIPER, — varieties.
BOX, — varieties.
PRIVET, — varieties.
ANDROMEDA, — floribunda.
COTONEASTER, — buxifolia, microphylla, margniata.

VARIEGATED EVERGREENS.

BOX.
PRIVET.
TAXUS, — argentea, aurea, and variegata.
THUJA, — variegata.
EUONYMUS, — japonica, half hardy (could be covered with straw).

VARIEGATED DECIDUOUS SHRUBS.

WIEGELIA, — rosea nana, dwarf, two to three feet high.
LONICERA, — brachypoda reticulata, climber, six to ten feet.
PHILADELPHUS, — variegatus, six feet.
SYMPHORIA, — racemosa, four feet.
DEUTZIA, — gracilis, six inches to two feet.
SAMBUCUS, — aurea (golden elder), eight feet; argentea (silver), three feet.

DECIDUOUS SHRUBS, — see lists on pp. 766, 767.

Then we might use for the low-growing evergreen trees, —

PINUS, — cembra.
ARBOR VITÆ, — varieties (some new and fine).
CRYPTOMERIA, — generally tender.
ARAUCARIA, — in shade.
ABIES, — alba nana.
BIOTA, — pendula (weeping Arbor Vitæ), nepaulensis, tartarica, and Siberian.
CEPHALOTAXUS, — drupacea, also Irish yew.
JUNIPERUS, — suecica, communis, hibernica, squamata (scaly leaved), very fine.
TORREYA, — taxifolia (rather large).

With these shrubs and low-growing trees, we should not need the larger trees, either evergreen or deciduous. I do not wish to be understood to discourage all tree-planting in small places, because there is a pleasure in trees which shrubs cannot give. Nor do I think that trees are satisfactory only when grown singly, and as specimen trees. I admire them as much in the grove, and well combined in groups, as single. Indeed, I think it is only by grouping, so as to get their mutual effects, that we can ever understand the full beauty aud capacity of trees and shrubs.

There are many persons who only appreciate a tree when it is grown like a specimen-plant in the conservatory, perfectly developed and balanced. In order to produce such trees, much more room must be allowed to each, and we must indulge ourselves with less in quantity or fewer varieties. I like variety as well as perfection, and should prefer to crowd a little, if I must choose between perfect trees and shrubs and few varieties, and groups with less perfect specimens.

The important point when we commence is, whether we shall plant for ourselves or posterity. If for the latter, arrange your plan so as to leave ample room between the trees as they are to ultimately stand, and fill in with such trees and shrubs as you will be willing to cut out when their duty as nurses is at an end.

If we plant for ourselves, decide whether we want specimen trees and shrubs, or close groups and immediate effects. If the former, we must wait patiently for the effect, which will come with time, and compel ourselves to cut down whatever grows too fast, and destroys the harmony of the plan we have laid out.

Latterly, great interest has been felt in growing in the greenhouse and in the open grounds plants with variegated leaves. It is a foreign taste, especially developed in Japan: the Japanese have several hundred varieties. The variegation is an unhealthy absence of the coloring matter of the leaf, and is curious rather than pretty; very often such leaves cannot stand the intensity of our summer sun; but when they will bear our climate, they are interesting as varieties; and some of them should be planted in all ornamental grounds.

The following list of variegated trees (of both kinds), as well as the list of variegated evergreen and deciduous shrubs, last given, was made by Mr. Francis Parkman, a most successful horticulturist, of Jamaica Plain, near Boston, who has found those he names hardy in his grounds, and they will doubtless prove hardy throughout our Northern States. The spotty foliage of these plants, valuable only as curiosities, will not permit them to be used in masses; they should always be grown with plenty of room, as specimen plants.

VARIEGATED DECIDUOUS TREES.

HORSE-CHESTNUT, — sixty feet high.
OAK, — forty feet high.
WILLOW, — ten feet high.
ACER NEGUNDO, — twenty feet high.
GINGO, — (Salisburia) twenty to thirty feet, rare.
ASH.

VARIEGATED EVERGREEN TREES.

CUPRESSUS, — lawsoniana.
THUJA, — occidentalis.
THUJA, — dolobrata.
CHAMACYPARIS.
RETINOSPERA, — aurea, argentea.

The growing interest in horticulture will insure that all new varieties will be tried, where one's grounds are extensive, and there is room for experiments; but for our thousand country homes they are of little value.

The commoner varieties of trees and shrubs are more accessible and cheaper, and are the best for general culture; no newly discovered trees have yet trenched on the merits of the white pine and hemlock, the oaks, maples, elms, and hickories of America; and whoever plants the known and loved trees and shrubs of our native land, giving them good soil to grow in, and good care in their infancy, need not envy his neighbors their foreign or variegated trees. He can produce effects with them which will make his home very beautiful, and capable of enduring the most careful criticism.

The secret of successful landscape-gardening lies in thoroughly understanding the various shrubs and trees which we can plant in any given place, and the effect they will produce alone and combined in groups. No matter how skilful one may be as an architect, how careful and successful as an engineer, unless he thoroughly knows and loves natural beauty, and understands how to produce it, he cannot hope to arrange a country place successfully. Too many persons suppose that how and where roads and paths are directed, flower-beds marked out, and kitchen-gardens planted, are the essential parts of laying out a place: these are essential as the canvas, the frame over which it is stretched, the palette, the brush, are the essentials of landscape-painting; the success of the landscape painted depends on the knowledge and use of color in the painter, combined with skill in drawing.

Inness, with a few rapid dashes of his brush, owing to his wonderful knowledge of color and memory of effects he has seen in nature, combined with a peculiar instinctive knowledge of the results of certain combinations of form and color, will make a picture of great beauty and lasting value in a few hours; other men may use his brushes, his palette, canvas, and colors, and be withal splendid draughtsmen, and yet work hours and days, and fail not only to produce a decent result, but even be utterly unable to copy successfully Inness's picture, which they have taken as a

study. On pp. 581 to 587 of this book, I have briefly sketched the elements which should enter into the composition of one who would make landscape-gardening his profession; and the experience of many years convinces me that I did not set the standard too high.

Landscape-gardening in America will never attain the position it deserves; for most of the work a landscape-gardener may do will be ruined by the neglect or caprice of the owner, the accidents of time, or the necessities of a growing population, which in a few years compel the destruction of places laid out with cost and skill. Where there are so many accidents, and when as a necessity much time must elapse before under the most favorable circumstances the perfected design can be realized, it is obvious that men of other professions, who lay out grounds to put money in their purses when their own business will not support them, and who are in no wise inspired with the enthusiasm of the art, may get good reputations; for they will probably make few mistakes in the skeleton of paths, roads, and gardens which are permanent, and the world will be but slowly educated up to the appreciation of true success in ornamental planting, which is the real test of the landscape-gardener.

Men will be employed to lay out grounds, not so much because they are thoroughly acquainted with the subject as because they are at hand, or cheap. Occasionally there will be a man who knows what a truly beautiful country place, park, or public garden is, and who will give the real artist a chance to produce the best result nature will permit; and for such rare opportunities the landscape-gardener must wait, content in the mean while to do whatever he can to improve the public taste.

The following letter from Mr. R. A. Grider was received too late to be noticed in the "Essay on Grape-culture," and as it seems to give valuable directions and advice for these parts of the country where the thrip is an annoyance, I have subjoined it, copying it in full.

BETHLEHEM, PA., Feb. 25, 1866.

To ROBERT MORRIS COPELAND, Winchester, Mass.

DEAR SIR, — Fruit-growers suffer much from bugs, worms, and other insects, but experience teaches that the larger-sized bugs, although destructive, are not as much to be dreaded as the small sized, which almost always appear in great numbers, while the former are comparatively few; the larger can be readily found and destroyed, but the smaller are not easily found, and are harder to extirpate. I need not give you a long description of losses caused by the thrip or grape-vine hopper, an insect of minute size, which is found on the young shoots of the vine, early in spring, when they first begin to sprout. They deposit their eggs on the young leaves and shoots. When first born, they can scarcely be seen without a magnifying glass, but soon legs appear and the perfect insect comes forth.

Whenever an egg hatches, it leaves a wound caused by the eating of the insect; the wound turns rose color, then purple, brown, and finally black. As the vine expands in growth, so does the wound in like proportion, and, although one wound does but little damage, many wounds cause great damage, as they not only destroy the growing crop, but sometimes every young shoot over acres in extent; and, of course, destroy the wood for the coming season, leaving the vines covered at first with festering sores, and then looking as if fire had passed, and left all black and desolate. Such is the experience we have had of that insignificant little hopper, known by different names.

We made many experiments ere we learned how to destroy the eggs, but now find it perfectly easy to do so. To destroy the eggs, powder them with air-slacked lime, which can be readily done in early summer before the foliage has expanded. This should be frequently done early in the morning, while the dew is on. After the leaves expand to about one-half their size, provide free-burning torches, and, when the weather is warm and the evening dark, let two persons, — one to agiate the vine, and one to carry the torch, — visit the vineyard; one shakes the vine, the other passes the torch under and about it, the insects start as soon as disturbed, and fly into the fire. Care must be taken not to heat the foliage, but it should be passed to and fro; if this

is done a few times, the thrip will be destroyed. They gain great headway only in the early part of the season; later in the season their enemies thin them out.

Many excellent practical fruit-growers believe that the black spots on the vine are caused by the sun's rays acting on drops of water after a shower, and, being condensed by the drops, burn the surface on which they rest.

Charlton, in his work on grape-culture, examined the subject, and accounts for the spots by the drops of water, which form a lens and burn the shoots; but as the wounds are found on the lower part of the shoot, this theory does not answer; as the rays of the sun cannot be concentrated there, the sun is not the cause.

I have stated these facts at meetings of fruit-growers, and have asked them to test the matter and correct me, if wrong, and have been so far confirmed.

I am, yours respectfully,

R. A. GRIDER.

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